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Sugarcane in Madras State*

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Introduction: It is proposed to review here the salient features of sugarcane research in the State in the last five years. It is not proposed to deal with the advances made elsewhere. The cane cultivators of this State are interested in new varieties, methods of manuring, irrigation, inter-culture and control of pests and diseases. While the cane cultivators of the State have proved their potential ability to achieve very high yields, it was by no means achieved by intimate knowledge of the crop in the field, nor through economic application of manure, water and pest control.

Varieties: The variety Co. 419, which was tested and released more than 15 years ago, continues to be the dominant variety in this State. Varieties Co. 449 and Co. 527, which are also recommended by the Department, for earlier harvests, have spread to a limited extent. Variety Co. 449, is particularly prefered in areas of water scarcity. This variety is hard to break and fairly resistant to smut. A good policy is one of keeping Co. 449 and Co. 527 in a part of the holding, as dependence on a single variety is neither safe nor economic (Dutt. 1954). In the case of factory areas, a fair proportion under these three varieties is recommended to raise the average sugar recovery percent.

In recent times, it has been doubted if the breeding and selection of new varieties have kept pace with the deterioration of the existing varieties of the field and the demands of the industry for higher yields and better quality in cane. (Harban Singh 1954). It is indicated that there is no genetic deterioration in cane. (Patwardhan 1951). Iyer (1951) reported on varietal deterioration by statistical study on yields in Shajahanpur. While it is true that the average yield shows a tendency to drop, it is not attributable to genetic deterioration of the variety. The average yield of the variety Co. 419 in Anakapalle Research Station, has dropped from 55 tons cane per acre to less than 40 tons only. In 1951—1952 when the crop was given 375 lb. nitrogen per acre as against the usual lower dose, the yield shot upto 63 tons cane per acre from the low yield of 40 tons. In the yield competitions, ryots have achieved yields of nearly 100 tons cane per acre with as little as 150 lb.

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nitrogen per acre. The falling yields in the Pugalur sugar factory zone was pulled up in one season by better cultural treatment to the crop. It is therefore for detailed examination what aspect in the treatment of the crop contributes to this fall in yield. Dutt (1950) pointed out that our canes are not poor in quality. The average yield of cane for the competitors in prize competitions scheme was 75·1 tons in 1951—'52 and 79·22 tons in 1952—'53. The change in the cultural practices in the cane development centres has brought about increase in yield from 27 tons to 33 tons of cane per acre and by adopting earlier planting both yield and quality improved.

One may express disappointment that no new variety was released for cultivation in the last one decade. The variety Co. 419 has set up, very high standard for yield. The data in table 1 indicate that some varieties proved to be better in yield or quality than Co. 419, but they could not be consistently better that Co. 419 in respect of both.

TABLE I.

Comparison of Co. 419 with other varieties under test.

Year	Variety	Yield in tons cane per acre	Sucrose % in juice	Purity % in juice
1943—1944	Co. 419	31·80	18·91	91·75
	Co. 449	36·64	20·06	93·78
1944—1945	Co. 419	27·75	17·30	88·67
	Co. 449	30 98	19·66	92·49
1945—1946	Co. 419	45·72	17·51	88·93
1946—1947	Co. 419	29·61	19·63	95·68
	Co. 467	48·71	18·95	91·12
1947—1948	Co. 419	20·57	17·59	91·49
	Co. 467	26·74	17·82	86·56
1948—1949	Co. 419	35 84	19·24	89·74
	Co. 467	42·63	18·50	89·21
1949—1950	Co. 419	39·21	19·21	94·34
	Co. 467	40·60	18·52	92·15
1950—1951	Co. 419	38·02	16·56	82·83
	Co. 467	42·36	17·89	86·36
1951—1952	Co. 419	37·83	14·01	78·22
	Co. 620	36·59	19·44	92·98
1952—1953	Co. 419	30·60	15 83	83·26
	Co. 630	27·90	18·09	87·22
1953—1954	Co. 419	39·30	15·48	94·38
	Co. 620	32·54	18·75	87·98

The three standard varieties Co. 419, Co. 449 and Co. 527, can still hold the field and what is needed is a proper schedule of cultivation in order to achieve maximum yields.

That yields in this State are not so poor as is generally believed to be is indicated in table 2.

TABLE 2.

Comparative yield data for different countries.

Name of the Country	Yield of cane in tons/acre	Sugar recovery %	Yield sugar tons/acre
Cuba ...	17·12	12·25	2·050
Lousiana ...	19·84	8 06	1·602
Puerto-Rico ...	24·16	12·23	2·956
Hawaii ...	62·05	10·46	6·480*
Mauritius ...	19·63	12·08	2·370
Java ...	56·20	11·49	6·440
Formosa ...	28·27	12·93	3·657
Australia ...	21·34	14·33	3·060
India ...	14·70	9·50	1·394
Uttar Pradesh ...	18·40	9·78	1·800
Bihar ...	16·10	10·10	1·626
Bombay ...	40·50	11·59	4·694**
Madras ...	33·50	9·39	3·146

* Duration of crop 20 to 22 months.

** Larger proportion of crop being Adsali (18 months).

Lakshmikantham (1951) reported that Co. 419, is superior even to the varieties of Hawaii in respect of nitrogen utilisation. It may therefore be stated that the variety of cane in Madras is capable of high yield consistant with quality and hence high yield of sugar per acre is yet attainable. The general average yield is low due to the small ryots not having the timely credit facilities for intensive cultivation.

Manuring: Next to variety, manure plays the largest role in increasing production. As in other countries, largest response is for nitrogenous manures and as such, this item received the largest attention in recent years (Lakshmikantham et al 1949. Lakshmikantham 1952. Parthasarathi 1952). Optimum dose of nitrogen

further confirmed by Rama Rao (1954), who reported a high negative correlation of —0·96, which seems to hold good under varied conditions.

After cultivation: The most important inter-culture operation is propping of cane. This operation costs nearly Rs. 300 to 350 per acre in the Circar Districts. Both the Indian Sugar Committee (1920) and Venkataraman Committee (1950) were impressed with the increase in yield of 10–15 tons, but at the same time emphasised the need to reduce costs. Experiments on wrapping and propping were conducted in the State, bnt the local bamboo propping was found to be the best (Lakshmikantham 1950). The need for bamboo propping in the northern coastal areas was believed to be due to the soil type and periodical cyclonic winds. In the past experiments at Samalkot, trench planting was found to lessen lodging but this method of planting was not tried with less costly method of propping. The surface planting in beds and the brittle nature of the variety under cultivation are the two major causes for the ryots resorting to costly and laborious bamboo propping. Parthasarathi and Reddy (1951) reported on a cheaper method of trash propping. Recent trials at Anakapalle and Samalkot indicated that combined with trench planting and trash propping cane cultivation is feasible in these areas with greater net profit per acre and less cost of production per ton of cane. Even in Southern Districts, this cheap method of propping is found to add 3 to 5 tons of cane per acre, facilitate irrigation in late phase and also facilitate clean cultivation and quicker harvest. It is necessary to select varieties which resist and also which do not break or deteriorate on lodging. Recent investigation at Gudiyattam (Vaidyanathan 1954), indicated that loss due to lodging is very small in Co. 499 as compared to that in Co. 419. Not only this variety is hard to break, but also the deterioration of juice in lodged canes is smaller as compared to that in Co. 419.

Pests and Diseases: Accurate estimates of loss due to pests and diseases were not made up for in this country. For example, it was widely believed that the early shoot borer is beneficial in increasing tillering and the smut causes heavy depression in juice quality. Investigation at Anakapalli (Ramachandrachari 1952, Parthasarathi et al 1953), clearly indicate the complex nature of loss due to borers and that the extent of loss is not indicated by mere borer infestation. The stage of crop at which infestation occurs and the month of infestation are both important. Usually, the infestation

is the heaviest in the month of May. When the infestation occurs in the early stages of the crop though there is apparent tillering the number of tillers per clump that is harvested is 2·57 for Co. 419 infested as against 2.95 of healthy; for infested Co. 475, it is 2.94 as against 2.45 of healthy. Apart from this reduction in survival, the weight of shoots that come to harvest from infested clumps was also reduced by 35.62% in Co. 419 and 28.25% in Co. 475 and variations in weight in respect of month of infestation was also noted. Therefore it is worthwhile to spend a fourth or a fifth of the estimated crop yield in controlling early shoot borer which is a serious pest in this State. Among the diseases, smut is of foremost importance. Detailed investigations on the growth and development of smutted clumps were made. It is usually interpreted that smut whip is a floral stalk. At Anakapalli precocious flowering in about 11 weeks age and in the month of July, was recorded, due to infestion of smut. But smut whips appear even in the germinating bud. It is too early for the shoot to form even floral premordia in its terminal growing point. Subramanyam et al (1951) indicated that the habit of the fungus to sporulate profusely and piling up spores might be responsible for the production of the whip and not precocious arrowing, which latter is impossible at such early stage in the development of the bud. The losses due to smut were also carefully estimated in plant and ratoon cane (Parthasarathi et al 1952). It is true that when the smut whips appears at the top of a grown up cane, loss in weight and juice quality are heavy. Studies on apparently healthy canes of smutted clumps, indicated that loss in weight of such shoots may be of the order of 47—51% as compared to canes of healthy shoots and that less in juice quality of such shoots is practically nil. Here again, the loss in weight of shoots and total loss from the crop will depend upon the time of infection. In cases of early infestation, total loss of clumps is common and more shoots die. June, July, August are the months of heavy Infections for the main season crop.

	Smutted.	*Healthy.*
Mean number of millable canes per clump.	3.15	5.56
Mean weight of millable cenes per slump. (lb)	6.38	13.11
Average weight of single cane in pound.	2.25	2.07
% loss in weight.	48	...
Sucrose % in juice.	17.64	17.38

It is therefore clear that loss in yield is far more than in loss in quality and the habit of sugar factories to point their fingers to presence of smut for poor sugar recovery percent is not altogether correct.

Studies in Gur: After Varahalu (1933, 1937), very little work on qualities of gur was done in this State. Recently, the chemical composition of juice and its relation to qualities of gur was investigated at Anakapalli (Mohan Rao, Narasimhan et al 1951, Mohan Rao, Anji Reddy 1951). In respect of the two varieties Co. 419, and Co. 527, it was noted that in the juice of Co. 527, which generally yields better quality gur, organic non-sugars, total and non protein nitrogen are lower and phosphate content higher than in the juice of Co. 419. When nitrogenous fertilisers are increased, organic non-sugars, colloids and pectins are increased, and phosphate reduced in the juice. Total and non-protein nitrogen also are increased as also the proportion of non-protein nitrogen to total nitrogen. In juices of immature canes, nitrogen and glucose are predominantly great. In canes raised under swamp conditions, organic non-sugars non-protein nitrogen and low phosphate are responsible for the resulting bad gur (Mohan Rao and Narasimhan—1951).

Studies at Anakapalli and Gudiyattam were conducted to standardise the use of lime as clarificant in gur making. It is well known that immature and deteriorating juices require more lime than for the juice at peak maturity stage. When the pH., level of the juice was studied, pH. 6.1 was found to be the optimum after clarification. At higher pH. level, the gur is harder but darkened, at lower levels the colour is better, but gur softened. Addition of superphosphate as a second clarificant after lime, invariably softens gur, but improves colour.

Clarification with juice of bendi plant (Hibseus esculentus) alone is the best when the crop is in peak maturity. In earlier stages combination of lime and bendi juice appears to be preferable. Hydros (Sodium hydrogen sulphite) improve colour very much, but it imparts pungency to taste. The deterioration both in colour and consistency are quicker and greater, when it is used as clarificant. Since colour of gur commands the highest premium in the market and not consistency, the use of hydros is widespread. The cause for rapid deterioration of colour in storage is a sunject of importance for further investigation.

Special types of godowns for storing gur are in vogue in Godavari District (Parthasarathi et al 1950). Each godown is capable of storing 50 to 100 tons gur and over 12,000 tons of gur are stored every year in these districts. These godowns are smoked to warm and dry up the internal atmosphere. The gur keeps condition for over one year. The commercial utility of the godowns is already well established in practice.

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Recent Advances in Cytogenetics*

by

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Plant breeding is actively concerned with the so-called improvement of Agricultural Crops. Vavilov defined Plant Breeding as an art, a science and a branch of agricultural practice. He was of opinion that a knowledge of genetics was not indispensable to a breeder; that evolutionary practices permeate the whole science of breeding and that in effect breeding was man's interference in the morphological formation of animals and plants. In other words it is evolution directed by the will of man. But breeding and genetics interpenetrate since they treat heredity and variation. The modern genetics and cytology again interpenetrate. Thus the new line of study Cytogenetics has sprung up. The modern plant breeding has to a large extent ceased to be an art. With cognate sciences it has attained a high complexity and become more exact. Cytogenetics though recent has grown so rapidly and has covered such a large number of cultivated species that it is well nigh impossible to summarise all knowledge in a short paper. Therefore in this paper are presented some of the trends in plant breeding.

The most reliable source of plant improvement is by gene-recombinations. The simple concept of the gene viz., one gene controlling a single factor expression has changed entirely. The genes undergo evolution in the course of succeeding generations. Thus there are far more genes newly added in the existing species than the ancestors ever started with. Though for many genetical purposes the simple older idea suffices, yet the newer results of analyses require us to change this concept. It is still in a speculative condition and it is conceived as of a biochemical unit but self reproducing. Its action thought specific, may vary with the position effect. Therefore it has to be viewed from both the physiological as well as the biochemical stand points. Sometimes a gene may be found to contain lesser genes and may result in a pleiotropic action. The phenotype responds to the environment (Darlington and Mather 1950). In cotton the hairy character of the leaf is known to be controlled by a major gene and a number of minor genes.

Turesson (1923) advanced the theory of Genecology. By this is meant the study of the species-ecology. From this point of view

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of Genecology the Linnean species represents a genetical complex community, the distribution and composition of which is largely determined by the ecological factors and the genotypical constitution of the individuals comprising the species community. The concept of the species from this point of view represents an intercrossing community, the members of which had become clustered in groups (eco-types) on account of the differentiating effect of environmental factors upon the genotypically heterozygous population. The object may be stated as investigation into the grouping in nature of individuals into ecospecies and ecotypes representing various combinations of mendelian factors and the causes controlling this grouping. A point of interest in Genecology is the rarity of inter-linnean species hybrids in nature, though they hybridise under experimental conditions, the distributional peculiarities of these hybrids, their localisation at isolated points within the region covered by the parents, their sporadic occurrence between the distributional areas of the parent species and the tendency of certain hybrids to increase when nature is disturbed by man. The mechanism at work here is thus crossing, recombination and selection promoted by spontaneous mutation (Muntzing 1951).

Apart from the nuclear controlled inheritance the cytoplasm has come to play an increasingly important role. Thus definite genes have been advanced called Plasma-genes which are also self-reproducing. The inheritance of the plastid has also been referred to self-propagating bodies called Plasto-genes present in cytoplasm. Their action may be controlled or influenced by the nucleus. The cytoplasm thus exerts great influence on the gene-action and vice versa. This has developed now into the Plasmon theory. Male sterility may be induced by definite plasmons (sorghum, maize, cumbu, onion and tomato). Further the differential behaviour of the hybrids in reciprocal crosses is alleged to the action of cytoplasm.

The next complexity usually arises by either the process of elimination or addition in the heritable material, changes involving the chromosomes may reflect on the phenotype. The older concept of the arrangement of the genes on the chromosomes as a string of beads has altered. Instead of its being conceived as a point on the chromsome, it is more a region of the chromosome. Thus the gene is "a field of co-ordinated activity the property of full activity being conditioned by internal arrangement but independent of external conditions."

Normally polypoids are supposed to show an increase in the gene quantity whether it be by auto or allopolyploidy. It is known that polyploidy endows a plant with increased variability and certain advantages over the diploid. Autoploidy induces the so-called gigas characters. The disadvantage in breeding further from an autoploid lies in its reduced fertility. Alloploid results from species and inter-generic hybridisation resulting in the combination of different plants. When sterility occurs in interspecific or inter-generic hybrids it is found that duplication of the chromosomes restores often the fertility. Thus an interest was stimulated in the artificial production of polyploids for breeding purposes. It was only in 1937 the most successful method of producing polyploids by means of colchicine treatment of plants was discovered by Blakeslee and Avery. Since then though autopolyploids were produced in many economic plants so for only a few have yielded plants of economic value viz., rye, beet, turnip, lucerne, tomato. In paddy the autopolyploids have given varying results depending upon the parental material, but there has been no marked increase in variability. On the other hand, in Cumbu, variability has increased manyfold and in addition perenniality has stepped in.

This dicovery of chromosomal duplication by colchicine treatment has increased the range of utilisation of incompatible interspecific and intergeneric crosses. Also polyploidy itself brings in a greater possibility of intercrossing, which is not usually possible at the diploid level. Thus in cotton the fertile amphidiploid of a partially sterile hybrid of *G. anomalum* (African wild cotton) x *G. arboreum* var. *neglectum* (K. 1 a short stapled, commercial cotton) gave a fertile hybrid with *G. hirsutum* (Co. 2. An American long stapled cotton). Similar hybrids were obtained by Harland (1940) between the amphidiploid of *G. arboreum* x *G. thurberii* and a new world cotton, These hybrids present great scope for further selections of recombinations. The amphidiploids may also directly give economic plants. Triticale, Agrotricum, amphidiploid of Cumbu x Napier grass have yielded new types of grain and fodder plants. A synthesised winter turnip rape (the amphidiploid of *Brassica rapa oleifera* x *B. oleracea* the cabbage) has given higher yield of oil by 25 to 30% over the control (Muntzing 1951). Polyploidy, grafting, and the use of bridging parent have been employed with success for overcoming incompatibility barriers between distantly related plants.

The chromosomal study in the haploids and hybrids has given a clue to the true nature of the present day economic plants. It is

interesting to find that most of the cultivated crop plants have arisen in nature as sterile hybrids of distantly related parents followed by chromosome duplication. Thus it has been possible to synthesise the existing species by hybridisation of other Linnean species e.g. *Galeopsis tetrahit* (Muntzing 1930), *Primula kewensis* (Newton and Pellew 1929). The cultivated Indian mustard *B. juncea* is shown to have originated from a sterile interspecific hybrid between *B. campestris* and *B. nigra* followed by amphidiploidy as also tobacco *(N. sylvestris* x *N. tomentosa)* and the tetraploid American cottons are of amphidiploid origin with one genome ancestral to Asiatic and another to the New world. The cultivated bread wheat is made up of two cultivated wheats viz., einkorn and emmer plus a wild species *Aegilops squarrosa.* It has been found that several wild species like *S. spontaneum,* and *Sclerostachya* sp. played a role in the building up of the modern sugarcane.

Induction of changes in the game has been attempted by both physical and chemical means. These are aimed at production of a chemical change resulting in a newer expression of the gene or the arrangement of the gene in a chromosome, deletion, duplication, inversion segmental interchange etc. Knight (1948) was able to transfer black arm disease resistance from one species of cotton to another by chromomome fragmentation and recombination. Some of the chemicals that have been used as mutagens are caffeins, camphor products, coumarin, acenaphthene, mustard-gas products, colchicine, some of the narcotics etc. Heat and cold shocks and irradiation with X-rays and radioactive substance are the physical means frequently employed. Of these the most powerful agent has been irradiation with X-rays. The number of mutations produced are numerous, many being uneconomical yet with careful selection highly ecconomical ones could be obtained. (rye, rape and barley). It could also be very usefully applied in the case of horticultural plants which are vegetatively propagated. Positive results have been obtained in the case of apples.

Disease resistant types have been built up by the method of hybridisation and back crossing or hybridisation, production of amphidiploids and back crossing. Back-crossing itself has gained a new and important application in modern plant breeding. Judicious back crossing can result in either substitution of a genome or part of it or the restoration of a particular genome in the species hybrids. Thus in the case of *N. tabacum* it has been possible to incorporate into it the mosaic resistance found in *N. glutinosa.* By the

technique of back crossing improved varieties of maize have been produced inspite of its heterozygosity. In cotton it has been possible to build together in the same plant resistance to jassids as also black arm disease. The hybrid of *P. typhoides* with *P. purpureum* has combined in itself resistance to rust and *Helminthosporium sacchari*. Similarly blast resistance in paddy has been built up from the hybrid of a resistant poor yielding variety with a high yielding one.

Still another type of abnormality is the phenomenon of apomixis. It may be obligatory or facultative. Mango, citrus and certain grasses are known to be facultatively apomictic. By this means, may be obtained both the sexual embryo and a number of asexual ones the latter alone repeating the maternal characters. Mangosteen is an example of obligatory apomict. In this species plants producing anthers are not known. By isolation of such obligatory apomict races it is possible to propagate a variety overcoming the chances of segregation. Apomixis is often induced by higher polyploidy following hybridisation and constant vegetative propagation.

One of the chief delimiting factors for wide crosses is the failure of the zygote to develop further. Successful pollination and even fertilisation may occur. The embryo placed as it is in an incompatible or early disorganising endosperm may fail to grow further as a result of certain toxic substances produced by the endosperm. This has been the stumbling block in effecting many much desired crosses between certain plants. A technique has now been developed with the help of which it is possible to remove the young embryos even less than a week old ones and grow them in artificial medium under sterile conditions. This technique has generally been called embryoculture. Successful cultures, however, have been still restricted to very few crop plants. The Russians have claimed that they were able to graft different cereals even at the embryonic stage when the seedlings just start growing.

Many fruits are sought to be bred for greater pulpyness and reduction of the seeds as far as possible, the variety being propagated vegetatively. Seedlessness has been found to be due to two causes. One it is gene controlled. The other can be induced by bringing in disturbances in chromosomal balance such as triploidy. In this case the production of inviable gametes prevents the formation of seeds. The stone fruits have not yielded for breeding of

seedless character. Parthenocarpy is another phenomenon which is genetically controlled as in the case of banana. This is independent of chromosomal unbalance. Certain chemicals and hormones have been found to produce parthenocarpic development of fruits as in tomato etc.

Heterosis or hybrid vigour has been much in the picture for some time. The discovery in maize of production of plants with greater vigour and yield on hybridisation of two inbred lines has given rise to its application in quite a large number of plants. The question arises whether hybrid vigour is expressible in strictly self-fertilized plants. Its effect has now been commercially applied in the case of maize, brinjal, sugar beet, cumbu, tomato etc. In the case of plants which are hermaphrodites emasculation becomes necessary. In such cases male sterility can be induced by irradiation with X-rays. More recently the cytoplasmic induced male sterility is also being exploited for production of hybrid seeds. Apart from these few cases mentioned numerous other advances have occurred in the methods of plant breeding and hybridisation. It has been possible to breed for special purposes. In the achievement of these objects there has been a persistent effort by numerous workers at collection of materials of crop plants from their original homes. Thus an extensive arboretum was maintained by Vavilov in Russia consisting of several thousands of varieties of a single cultivated crop. By such extensive collection and studies on these living specimens it has been possible to trace to a certain extent the origin and spread of a few of the cultivated crop plants. The production of new plants to meet newer conditions either pathogenic or environmental calls in co-ordinated research of all branches of agricultural sciences.

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Observations on wheat rusts in Madras State

by

T. S. RAMAKRISHNAN

In Madras State the cultivation of wheat is limited to an area of about 2500 acres in all. The major portion of the area is on the Nilgiris and Pulneys and the hills of Salem and North Arcot Districts. In the plains the total extent under this crop may not exceed a hundred acres (in Coimbatore, Salem and Madura Districts). Two crops are raised in a year on the hills while in the plains wheat is sown only during the cold season from November onwards.

On the hills the main variety under cultivation goes by the name of 'Samba' wheat–*Triticum dicoccum.* The ears are awned and the grains are enclosed in the glumes. After harvest, husking is necessary to separate the grains. The local population has a partiality for this hard-grained variety on account of its suitability for the special method of utilisation as whole grain or semolina as practiced in the tract. In recent years either through departmental propaganda or on the growers' own initiative, varieties of wheat belonging to *T. vulgare* have been tried on the Nilgiris. Though increased yields of grain have been obtained from some of them, their cultivation has not extended as these are mostly suitable for making flour only.

Although the acreage under wheat in this state is limited, it is affected by all the three rusts known on this crop, viz., black rust–*Puccinia graminis,* brown rust–*P. triticina* and yellow rust–*P. glumarum.* Of these three rusts the last is known to occur only on the hills where it has been observed on wheat, barley and a grass, *Bromus catharticus.* The two other rusts are prevalent on the hills and the plains. The brown rust is the most wide-spread and is the first to appear on the crop. Black rust incidence occurs invariably much later. Owing to the prevalence of these rusts legislation had been enforced to suspend the cultivation of the summer crops in this state in some years.

The 'Samba' wheat on the hills exhibits high field resistance to black rust. But the '*Vulgare*' wheats like N. P. 111 and 165 and other unnamed varieties are heavily rusted. However in the plains the 'Samba' wheat is also as heavily infected by black rust as the '*Vulgare*' varieties. The higher temperature prevalent in the plains

favours the infection. Seeds of 'Samba' wheat were obtained from the Nilgiris and sown at Coimbatore. The resulting crop exhibited over 40 per cent crop infection, individual plants sometimes having 100 per cent plant infection. A crop raised from the same lot of seeds at Keti (Nilgiris) was not infected by black rust. This freedom from rust at Keti is mainly due to the differences in the climatic conditions.

Direct control of the rusts of cereals by the use of fungicides is neither economical nor practicable under field conditions. Therefore the main line of attack for the control of the rusts has to be through the cultivation of rust resistant varieties. This again is beset with difficulties as it is well nigh impossible to get agronomically satisfactory varieties exhibiting resistance to all the races of the three rusts. By analysis of samples sent from different parts of the state to the wheat–rust–testing station at Simla the races prevalent in this tract have been ascertained through the help of the Head of the Division of Mycology, Indian Agricultural Research Institute, New Delhi. These are recorded hereunder.

TABLE I

Races of rusts prevalent in Madras State

Years	Black rust	Brown rust	Yellow rust	Authority
1932 – '37	15, 10, 42	10, 20, 63, A, B	13, 19, 20, A, F	Mehta (1940)
1950 – '51	21	63, 107	19	Head of the division of Mycology, I.A.R.I. New Delhi.
1951 – '52	21, 34, 42	11, 20, 26, 63, 106, 107	19	
1953 – '54	21, 34, 40, 42, 194, and C	10, 11, 20, 26, 63, 106, 107 and 108	19	

The above analyses indicate that only a limited number of races occur in this State. However, slight differences are evident in the races prevalent during different years. In order to identify the races of black rust prevalent in Coimbatore and Wellington, seeds of the twelve differential hosts were obtained through the courtesy of Dr. R. S. Vasudeva from New Delhi. These were grown in pots at Coimbatore and inoculated with a rust sample collected locally. The rust was found to belong to the race 21. The seeds of the differential hosts were also sown in small plots in a wheat field at Wellington. There was natural infection from the neighbouring

wheat crop and from the reaction on the differential hosts the race 21 was found to be prevalent in this area also. The analyses made by the division of mycology, New Delhi, also showed that the race 21 occurred in the samples sent every year. This race appears to be widespread. A new race has been isolated from Coimbatore on Kenphad 28 by the Head of the Division of Mycology, New Delhi during the last season. This variety was only very recently introduced into Coimbatore from Bombay State. The occurrence of a new race of the rust on this newly introduced variety raises a new problem. The introduction of new varieties from outside may lead to the development and the spread of new races of the pathogen and thus complicate the breeding programme for resistant varieties.

In order to improve the yield of wheat in this State by the introduction of rust-resistant varieties, attempts were made from time to time to obtain from other parts of India and from outside the country reputed rust-resistant varieties and grow them at Coimbatore and the Nilgiris. The varieties suitable for the plains did not always come up well on the hills. Further, their reaction to the rust was also modified in certain cases by the change of the venue. The varieties tried and their reactions are given in Table II.

These trials have shown that 'Samba' wheat is not intrinsically resistant to black rust. At higher elevations however this variety exhibits low infection by this rust under field conditions, presumably influenced by the differences in the climatic conditions. But the same variety under the Coimbatore conditions becomes heavily rusted. In both the localities it is highly susceptible to brown rust. The variety 'Gabo' also exhibits low incidence of black rust on the hills. It gives more than the twice the yield of 'Samba' but the grains are not hard enough to satisfy the requirements of the local population. Hence its spread is not as rapid as expected. In the plains however this variety is also severely infected by black rust. Among the others, the variety, 184. P2 A. I. A., from Kenya is not affected by black rust but is susceptible to brown rust. It did not appear to be suitable for cultivation at higher elevations. Even at Coimbatore it was found to be of longer duration than 'Samba'.

In 1954 a new variety called Spica T. S. K. P. F. 4601 was obtained from Australia through the good offices of the Indian Council of Agricultural Research. A portion of the seed was sown

TABLE II.

Field reaction of different varieties of wheat.

Variety	Place of origin	At Coimbatore: Percentage of crop infection: Black rust	At Coimbatore: Percentage of crop infection: Brown rust	At Coimbatore: Remarks	On the Nilgiris: Percentage of crop infection: Black rust	On the Nilgiris: Percentage of crop infection: Brown rust	On the Nilgiris: Remarks
Gabo	.. Australia	80	60	Satisfactory growth and yield	10	30	Good growth, high yield grain not so hard as Samba
Charter	.. ,,	15	60	Soft grained	5	40	Soft grained
Kendee	.. ,,	60	80	Similar to Gabo	10	40	Grain as hard as that of Gabo
Celebration	.. ,,	60	80	Not so good as Gabo	20	60	Soft grained
Yalta	.. ,,	Not tried			40	60	Soft grained
Kenphad 34	.. Niphad (Bombay)	20	80	Plant infection by black rust less than 5 per cent	Not tried		
,, 28	.. ,,	30	100	Yield better than Samba	5	60	Not quite suited to high elevations, longer duration
,, 25	.. ,,	50	100	,,	Not tried		
No. 177	.. ,,	70	100	Not satisfactory	,,		
Hofed	.. ,,	40	100	,,	,,		
N. P. 165	.. I. A. R. I. New Delhi	100	100	Heavily infected	80	80	Soft grained
360 H.	.. Kenya (through the I. A. R. I.)	5	60	Did not flower	Did not grow satisfactorily at Ootacamund		
338 A. A. I. A_2	.. ,,	10	40	Longer duration than Samba			
337 BE_2 F_2	.. ,,	20	60	,,			
184 P_2 A. I. A.	.. ,,	nil	30	,,	nil	40	Longer duration than Samba
Samba	.. Anikorai (Nilgiris)	40	100	Yield low. Heavy infection by brown rust	5	90	Low yield
Samba	.. Coimbatore	60	100	,,	5	90	,,

at Keti in May 1954 and compared with Kenphad 28, 184 P2 A. I. A. and 'Samba'. This variety was completely free from black or brown rusts while there was heavy incidence of brown rust in the others. Black rust was rare in the other varieties too. The duration of the variety was of the same extent as 'Samba' while the yield was more than twice as much. The two other varieties came to harvest only one month later and the yield was lower than that of Spica. However this is the first year of trial and the merits of the variety could be judged only after further trials. Its freedom from both brown and black rusts under field conditions and the high yield obtained indicate that it may turn out to be useful for cultivation on the hills. The farmer in whose land the variety was grown is anxious to multiply the same in preference to 'Samba'. Its suitability for the plains is yet to be tested.

The studies conducted so far indicate that more attention should be directed towards the evolution of high yielding rust resistant strains of 'Samba' wheat for the South Indian conditions. The '*Vulgare*' wheats though higher yielding are not favoured by the local people. Further, resistance to brown rust is more to be kept in mind for the strains grown in this state. This rust is the earliest to appear and causes more damage in this state.

I am thankful to Sri N. V. Sundaram for his ungrudging help in conducting the field trials and recording observations. I must also express my gratitude to Dr. R. S. Vasudeva for help in analysing the races of the rust prevalent in Madras State and to Sri Chavan, Cereal Breeder of Bombay for supplying seeds of rust-resistant varieties of wheat evolved in Bombay. I am indebted to the various institutions which supplied the seeds of different varieties for trials in this state. I acknowledge the help rendered by the District Staff of the Agricultural Department of the Nilgiris in conducting the field trials.

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Marketing Committee Chronicle

CONTRIBUTED

BY

THE STATE MARKETING COMMITTEE

SUPPLEMENT TO THE MADRAS AGRICULTURAL JOURNAL

MESSAGE

from

M. B. GHATGE,
Agricultural Marketing Advisor to the Govt. of India

It gives me great pleasure to welcome the inaugural number of the "Market Committee Chronicle" jointly sponsored by the Market Committees in Madras. The need for such a journal which would pool the experiences of different market Committees has been greatly felt by the workers in the field of the marketing development work. The sponsors of this move therefore deserve to be congratulated for taking a lead in the matter.

Though Regulated Markets wherever established have conferred many socio-economic benefits on the producers and have been responsible for raising the tone of the marketing system in their areas, a great deal yet remains to be achieved. I am sure the Chronicle through its columns will help in educating the producer-sellers, the business community and the consumers and bring home to them all, the importance of orderly marketing in the planned economy of the country.

I wish every success to the Market Committees' endeavour in bringing forth this chronicle.

MESSAGE

from

SRI V. RAMASWAMI KONAR,
Ex-Chairman of Tinnevelly Market Committee

Among the many useful pieces of legislation enacted in our State which have conferred immense benefit upon the cultivators, the Madras Commercial Corps. Market Act, 1933, must be mentioned prominently; and I am very happy to note that Market Committees are co-operatively bringing out a Chronicle as a part of the Madras Agricultural Journal.

The Madras Commercial Corps Markets Act, was enacted as early as 1933. But it was first applied only in 1935 when it was introduced into Tirupur. Later, it was extended to South Arcot. It was only in the post-war development period that, owing to the sustained interest of the Agricultural Department, the extension of the Act to larger areas received an impetus. Many of the Market Committees, though still in their infancy, are doing excellent work and this has resulted not only in the poor cultivator getting his due share of the price of his produce, but also actualy in putting the system of trading on a sound footing. There is great scope for improvement and the Market Committees should plan for better and effective regulation leading to scientific marketing.

It is my earnest hope that this Chronical would be an Encyclopaedia of marketing information and would also serve as an useful scource of market intelligence for the traders and the growers alike.

Regulation of Markets in India
Retrospect and Prospect

by

R. T. MIRCHANDANI
Senior Marketing Officer, New Delhi

1. **Introduction**: Orderly marketing acts as an excellent incentive for increased agricultural production and its importance in the planned economy of a country needs no emphasis. It is common knowledge that in our country the standard of agricultural markets where the produce changes hands for the first time from the producer to the tradesman and the farmer converts his crops into cash, is extremely poor. These markets barring those now regulated are generally ill-equipped to fullfil the functions which are theirs, in the country's economy. The Royal Commission on Agriculture (1928) commented at length on the defects prevailing in agricultural marketing and recommended that "these can only be removed by the establishment of properly regulated markets". The findings of the Royal Commission were fully borne out by the surveys on the marketing of several agricultural commodities conducted by the Directorate of Marketing and Inspection. Among several measures recommended by the Planning Commission for improving the efficiency of the marketing system and for promoting orderly marketing of agricultural produce, regulation of markets and market practices has been recom mended as a first step.

2. **Progress of Regulation**: (a) *Legislation*: Prior to the report of the Royal Commission on Agriculture, statutory regulation of markets was in force in Berar then known as the "Hyderabad Assigned District" and the Bombay State had enacted the Bombay Cotton Markets Act in 1927. The emphasis laid by the Royal Commission on Agriculture had a salutary effect. and resulted in a number of States taking steps in this direction. Market Acts empowering market regulation have since been passed in a number of States. Prior to the first Five Year Plan, Acts for regulation of markets and market practices were passed and enforced in the States of Bombay, Madras (composite), Madhya Pradesh, Punjab, Pepsu, Hyderabad, and Mysore. Before the formation of the Madhya Bharat State, rules and regulations for regulating markets were also in force in eight of the States which have now merged in Madhya Bharat. The Government of Madhya Bharat have now enacted and enforced a composite Act in their State. With the separation of Andhra, the Madras Act continues to be applied to markets in that State.

(b) *Number of regulated markets:* The progress made in extending the application of the Agricultural Produce (Markets) Acts in various states is indicated in the table below :—

Number of regulated markets in various States.

State	1940	1945	1950	1951	1952	1953
Bombay ...	7	15	62	75	83	88
Hyderabad ...	22	28	54	67	70	73
Madras (composite State) ...	6	6	27	28	28	27
Madhya Pradesh ...	34	43	46	46	49	51
Madhya Bharat ...	...	...	46	46	46	47
Mysore ...	...	...	3	4	7	8
Punjab ...	...	43	52	63	63	60
Pepsu ...	...	...	39	39	39	39
Total ...	69	135	329	368	385	403

It will be observed that the regulation of markets gathered a new momentum during the period of the First Five Year Plan, though the progress during the five years from 1945 to 1950 also appears to have been quite significant in Bombay, Hyderabad, and Madras States.

3. **Benefits of regulation:** The survey conducted by the Directorate of Marketing and Inspection reveals that though the results of this beneficial measure have not been so spectacular and impressive, it has no doubt conferred many socio-economic advantages on the producers in the areas where the Acts have been enforced. As a piece of economic legislation the Markets Acts may be considered extremly useful. As a rough estimate over one thousand lakh maunds valued at about 250 crores of rupees were marketed through the regulated markets in 1953. There has been beyond doubt a visible reduction in marketing charges in markets managed by the market committees constituted under the various Acts. With the reduction in market charges and some rationalisation of market practices the marketing efficiency has no doubt improved and the monetary gains to the producers have therefore been obviously large. Many of the regulated markets have established market yards with provision of facilities for parking of carts, arrangements for drinking water, cattlesheds. sheds for cooking, library etc. In several markets, marketing services such as storage facilities, grading and issue of market bulletins have been introduced. The regulated markets constitute the most reliable source for market statistics and thus render a valuable service, particularly in a period of planning.

Apart from the economic benefits the real merit of this measure lies in its educational value, particularly to the producer sellers. The active interest taken by the State Governments in the regulation of market practices has brought a realisation to the producers that marketing is not a private preserve of the businessmen as it was hitherto. The

producers in the vicinity of regulated markets have shaken off their inferiority complex and their traditional indifference to the marketing of their farm produce by themselves. They have developed a marketing sense and are now quite conscious of their rights and do not unquestionably and meekly submit to the wishes of the commission agents.

The regulated markets being democratic institutions have helped in developing among the farmers the corporate sense. The association of growers with the administration and management of the markets has enabled them to acquire valuable information in respect of the advantages of various marketing improvements and also unveiled to them the tricks of the traders and the loopholes in their practices and methods.

Apart from the benefits that have accrued to the producers, the working of the regulated markets has brought a new sense of obligation to the business community, though at a slow pace. The market functionaries who were opposed to any regulation have realised that they cannot have all their way in the marketing of agricultural produce and have gradually submitted to the discipline imposed on them by the State legislation in this regard. Wherever this realisation has been quick, the entire atmosphere in which marketing takes place has considerably improved. The mutual distrust between the seller and the buyer is fast disappearing. In short, the regulated markets have exercised a very wholesome influence on the marketing structure and have generally raised the tone of the marketing system in their areas.

4. **Future development**: The preceding paragraphs dealing with the economic and psychological merits of market regulation should not lead one to the belief that all that is necessary for stepping up marketing efficiency has been achieved. The encouraging results obtained in some areas should lead to intensification of efforts in pursuing this development programme with greater vigour in other areas. As will be observed from the earlier paragraphs, market legislation has been introduced in only nine out of twenty eight States. In states where the Acts are in force, while many important markets have been regulated, the small markets and village sales still remain unregulated. As regards the coverage of the major agricultural commodities brought under regulation, a lot still remains to be done. Except in Bombay State regulation of markets for cattle, fruits and vegetables has not yet been undertaken. Thus at present regulation extends only to a small fraction of the total agricultural production and a large sector still remains outside the regulatory orbit. In these States the Acts require to be extended to new markets and additional commodities.

The studies so far made have also indicated the scope and further possibilities, which exist in the various States which have passed and enforced the legislation, for increasing the utility of the Acts by better

and stricter enforcement of provisions, by the respective Governments through more efficient committees. Though there is some improvement in the rationalisation of marketing practices, much remains to be done particularly in respect of methods of sale which in most of the markets still continue to be defective. The '*hata*' system (bid under the cover) still prevails in some markets. The '*Fardi*' system prevalent in Hyderabad markets has been the cause for the demand of '*Kadta*' or reduction in price and the reputation of the regulated markets has been affected due to the continuance of this practice. Such systems require to be improved or replaced.

Some of the old regulated markets which have established themselves and have gone ahead with improvements can with no difficulty introduce grading of farm produce before sale and trading on the basis of standard contracts. The warehousing activity which provides cheap agricultural credit can also be undertaken by some of the market committees.

The financial position of most of the market committees prevents them from undertaking constructive works and from providing minimum amenities within the market yards. In this direction the Hyderabad State has built up a Central fund by pooling the contributions (40% of the total income of a Committee) made by various committees. The fund is utilised for maintaining supervisory and audit staff and the surplus is utilised for ameliorative works. To build up this fund the Government of Hyderabad introduced the system of collecting market fees on *ad valorem* basis at annas four per cent in all the markets. The same principle can be adopted by other States and funds collected for undertaking development work in the regulated markets.

The market committees are the principal organisations through which the provisions in the State Acts are translated into practice and objectives laid down achieved. Much therefore depends on the efficiency and the integrity of the committees. The markets which are efficiently managed have made rapid progress. The constitution of the committees particularly the first committees therefore deserves special attention.

Glossary of term used

'*Fardi*' System—The auction according to this system is done in the absence of the commodity and the day's arrivals are offered to the highest bidder.

'*Kadta*'—An allowance or reduction in price due to quality.

MARKET NOTES AND PRICES

Market conditions of Supari (Arecanut) and Coconuts at Mangalore during December 1954 as reported by the South Kanara Market Committee, Mangalore.

1. The range of *market prices* for the month :—

For the week ending	Koka	Choll	Malabar supari	Mangalore supari	Copra per candy of 660 lbs.	Coconuts per 1000 nuts
	Rs.	Rs.	Rs. (per cwt.)	Rs.	Rs.	Rs.
2—12—1954	70 to 105	145 to 166	95 to 115	115 to 136	330 to 350	Raw-160 to 185 Dry -180 to 250
9—12—1954	65 to 105	145 to 165	do.	115 to 140	320 to 340	R- do. D- do.
16—12—1954	60 to 110	152 to 168	107 to 129	115 to 142	325 to 335	do.
23—12—1954	75 to 110	150 to 171	110 to 130	125 to 145	325 to 340	do.
30—12—1954	75 to 105	140 to 168	110 to 130	125 to 145	325 to 345	do.

2. The estimated *stocks* held and exports ("SUPARI") :—

Opening Balance Cwts.	Receipts Cwts.	Exports Cwts.	Closing Balance Cwts.
4,098	16,500	16,898	3,700

The price of "supari" was practically steady with only slight fluctuations because of good demands from Bombay. The price trend appears to be firm. The price of copra was also fairly steade. Coconut prices continued to be firm with a tendency for a rise for good nuts.

K. TAJAPPA SHETTY,
10—1—1955. Secretary, S. K. Market Committee.

Research Note

Pungency Relations of *Allium Cepa* (Onions) and *Allium Sativum* (Garlic)

Allium Cepa (Onion) and *Allium Sativum* (Garlic) both members of the natural order *Liliaeceae* are reputed for their pungency. They are agriculturally classed as spices and are freely used to the flavour and taste of our vegetable preparations. Whereas green leaves of these species of plants are in no way inferior in this respect, the more common use of their bulbs is the reason for their availability all the year round. With a view to precisely understand the pungencies of *Allium Cepa* (onion), *Allium Sativum* (Garlic) and their different portions, pungency estimations were made in a large number of stored samples, as milligrams of sulphur after the method adopted by Platinius and the observations thus recorded are presented in the table below :

Pungency values of *Allium Cepa* (Onion) and *Allium Sativum* (Garlic) estimated as milligrams of volatile sulphur from 500 grams of fresh material. (Average of six samples in each case)

Allium Species	Volatile Sulphur content for				
	Whole Bulbs	Inner Scales or clones	% of increase or decrease over whole bulbs	Outer Scales or clones	% of increase or decrease over whole bulbs
A. Cepa (Onion)	57·67	65·82	+ 14·15	49·44	— 14·28
A. Sativnm (Garlic)	55 68	40·86	— 26·62	66·98	+ 20·29

It is found that the volatile sulphur content for the whole bulbs is very nearly the same for both the species. A comparison of the data obtained from the inner and outer portions of the bulbs, however, reveals an interesting reversibility. The volatile sulphur content for the inner scales of onions averages 65·82 milligrams. This value is 14 per cent higher than the one obtained for the whole bulbs.

In the case of garlic, the volatile sulphur content for the inner clones, on the contrary, averages 40·86 milligrams. This is about 27 per cent less than the one recorded for the whole bulbs of garlic. The volatile sulphur contents of the outer scales onions and outer clones of Garlic average 49·44 milligrams and 66·98 milligrams respectively, i. e., 14 per cent less than the whole bulbs in onions and 20 per cent more than for the whole buibs in garlic. As the amount of volatile sulphur content in either of these two species gives a fair estimate of their pungencies, or in other words, of their quality and character, determinations of this type seem amply useful, (1) in judging the relative values of

different *Allium* Sp. (2) in understanding the relative merits of different varieties of each species and (3) in finding out whether a particular type can be used as vegetable or spice.

T. V. RADHAKRISHNAN.

Platinius Hans & Kott, J. E. (1935) "A method for estimating the Volatile Sulphur content and pungency of Onions". Jour. of Agric. Res. 51 : 847 - 853.

Abstract

FOR ANTIBIOTICS, USES GALORE

The Multitudinous uses of Antibiotics : Almost unknown 15 years back, antibiotics have sold out to the tune of 1,470,000 lb during 1953, a breath-taking figure indeed ! It will be surprising to realize that its real field of activity is in animal growth stimulation and not in human medicine.

3500 different antibiotics have been isolated and studied so far ; but due to low potency or high toxicity of most others, only Penicillin, Streptomycin, Terra mycin and Bacitracin have been extensively employed in non-pharmaceutical preparations.

The use of antibiotics for animal growth stimulation is considered as one of the greatest advances in animal nutrition during the century. The action of antibiotics is not yet clearly known, but it is probable that they destroy the micro organisms that compete. for food, with the animal, or accelerate synthesis of growth-promoting B-Vitamins in the animal's intestine.

Use in Animal growth promotion : Tests show that antibiotic-fed chickens develop 10-15% faster. The common antibiotics used in poultry feeds are Penicillin, Aureomycin and Terramycin, the first being most popular because of its specific effectiveness and low cost. Antibiotic-fed turkeys are 15-20% heavier. Antibiotics find a major use in swine-feeding which results in 10-20% growth increase. In the case of ruminants, the action of antibiotics finds prominence in cutting down disease and death incidence among animals.

Trends in Average Dosage Levels : In animal growth stimulation, the foremost development of the day is the feeding of higher dosages of antibiotics. Although previously the conventional dose was 2 to 10 grams per ton of feed, the present trend is to increase the dose to 50 grams or more.

Growth responses are possible in cats, dogs, horses, rabbits, pheasants and even tropical fish. Similarly, by treating bees and silk-worms with their specific antibiotics, the production of honey and silk can be greatly stepped up,

In the prevention and cure of specific animal diseases antibiotics continue to play a vital role.

Plant Disease Control : Antibiotics have currently been tested out on a large scale in disease control. Agri-Mycin (a mixture of Streptomycin and Terramycin) is especially promising for fruit trees. Unlike most conventional pesticides, which merely coat the plant surface, antibiotics are diffused throughout the plant interior and cannot be washed away by rain. In future, antibiotics are expected to play a vital role in the fight against fire blight of apple, pear and peach trees. Recent experiments show that even at lower concentrations, antibiotics are effective, thus making their use an economic proposition.

Fungicidal uses : Actidione is used for prevention of leaf spot in cherries. Streptomycin derivatives are highly useful in checking halo blight of beans. The same antibiotic is also used in destroying micro-organisms on a variety of seeds, and also for prevention of bacterial wiet of chrysanthemums.

Use of Food Preservation : Although antibiotics have been of great value in the preservation of milk, fish, meat. vegetables and other food-stuffs, their use has been restricted, because they have been viewed as "public health hazards" by Government, as, by their use, bacteria in the human body might develop resistance and render therapeutic doses of antibiotics ineffective. However, their importance is gaining greater recognition, and prospects are bright for their widespread utilization.

Food canning: Antibiotics were hailed as the answer to many canning problems. Subtilin was found to be effective in this direction. But as a very high order of sterilization is prescribed for successful canning, the use of antibiotics may not be as spectacular as envisaged in the early stages.

Industrial fermentation : By destroying unwanted bacteria, fermentation industries are now able to conduct operation unhampered by side-fermentations set up by useless microbes.

For a number of years chemists have been trying new uses for antibiotics-prevention of mildew of rope, cloth etc, supression of scum formation in paper mills and tanneries, and the elimination of marine fouling. But, at present, antibiotics cannot compete economically with compounds already in use.

It must be admitted that this field of research is still in its early stages. A number of problems remain to be solved before antibiotics could find completely satisfactory use, but the indomitable will of researchers can meet any problem as it arises.

(Chemical & Engineering News Vol. 32, p. 4640, 1954) [J. D. D. & A. M. K.]

Our Cover : The building pictured in our cover page is the Agricultural Dairy which serves as a model Dairy to the B. Sc. (Ag.) students of the Agricultural College, who learn all about Dairying and Dairy Husbandry within its portals.

THE IMPACT OF GENETICS ON BREEDING

by

Dr. S. C. HARLAND *

Plant breeding, Dr. Harland observed, was in practice even before the rediscovery of Mendel's laws, but in those times it was more an art than a Science. Selection towards desirable ends from the economic point of view was the tool, and most of the cultivated plants of to-day have their origin that way. Such a practice of domestication from the wild types has, in fact, developed monstrosities which are able to survive satisfactorily only under the peculiar conditions of cultivation, which are not usually obtained in nature. In the wild state a balance is struck between the genetic constitution of the individual and the environmental conditions in which they grow, so that many might be found to progress well, under circumstances which might look highly adverse. In the process of domestication, man interferes with the genetic and vitality complexes of the plants that exist in nature and in trying to develop individual with a high concentration of genes which determine the characters suited to his tastes and needs, alters also the vitality complex to which sufficient attention is not paid. As such, though certain characteristics are well developed in domesticated plants others which enable them to come up well under conditions obtaining in nature are lost sight of and finally reflect as serious defects. The stability that has been obtained through the long period of evolution in nature is interfered with and drastic changes occur in adopting to the changed environment. This is clear from the fact that if the history of any domestic plant is examined it is found that the rate of mutation is higher than in the wild.

The common cabbage, taken as an example, is a monstrosity that has been created by such domestication and bears little resemblance to the wild cabbage, its ancestor. Though the common cabbage has come up to a high standard in its qualites from the commercial point of view it has the serious defect of being easily affected by the deficiency of boron. It might look surprising, how its ancestor in the wild is able to grow up satisfactorily even under such adverse conditions as in rocky areas, where there is little chance of having any sufficiency of all minor elements. The difference has been due to the loss of such qualities, which have not been taken cognizance of in the process of domestication. Similar is also the case in many instances where the reproductive complex is already affected under domestication. In the course of his talk Dr. Harland advanced and discussed the four basic factors, which he named as complexes viz; (1) Genetic and Vitality complex. (2) Reproductive complex, (3) Buffer or minor elements complex and (4) Antimutability complex, underlying principles of successful plant improvement.

To achieve success a plant breeder must be in intimate association with his plant, he must look to them as his own children, Dr. Harland observed. In any study the analysis must be based on clear knowledge of all factors influencing it as far as possible and close observation and not merely on accepted facts. For instance, in breeding for resistance to diseases it is essential that the reaction of the host must be studied with reference to the differences in pathogenecity of different races of the parasite. This necessitates a knowledge of plant pathology as a pre-requisite and brings into the picture the heredity of host as well as that of the parasite. The work on hybrid corn, which has made great progress in America, has given us much in explanation of heterosis and it is generally believed

* Extract of the address given by Dr. S. C. Harland, F. R. S., Prof. of Botany, Manchester, under the auspices of the Madras Agricultural Students' Union, on 31—12—1954.

that varieties of this cross-pollinated species which show heterotic vigour, go down heavily in vigour on inbreeding, due to segregation of genes conditioning heterosis. This cannot always be taken to be the case, for in his own experience in breeding maize in West Indies, Dr. Harland said, he had observed certain races which lost little vigour on inbreeding. This must be due to the peculiar way in which selection has been practised by the native farmers resulting in a proper balance of genes necessary for adapting to the environment and for maintaining the commercial qualities.

Dr. Harland also touched upon the dangers that are apt to stem forth from the atomic radiations of such destructive weapons as the cobalt bomb. The high rate of mutation induced might even result in the origin of highly virulent races of parasitic organisms, like those of rust still unknown, which might completely devastate whole crops of wheat that are resistant to many races at present.

Genetics has thus begun to transmute the old art of plant breeding into a well advanced science and in practising it, individual problems should be tackled from many different angles. In conclusion, Dr. Harland exhorted that every plant breeder should have the "Eyes of Argus and the handa of Briareus".

(P. M. M.)

GLEANINGS

Rainmaking—A New Twist: At Longkloof, on the eastern cape, South Africa, one may frequently see farmers rush to their fields and fire barrages of rockets into the skies. They are shooting at no animate enemy, however, only man's oldest foe, the elements of nature.

In a matter of minutes after the rockets are fired, harmless rain falls from menacing hail clouds. So far this year the farmers have fired over 200 rockets worth $ 14 each. "Spending $ 2,800 on rockets is cheap" says one farmer. "Six years ago a violent hailstorm laid waste a $ 1,40,000 apple crop in this valley."

It was after that catastrophe that the farmers called on their neighbour, J. H. Kritzinger, lecturer in inorganic chemistry at Stellenbosch University. Kritzinger offered the rocket solution. Once in the clouds, the rockets, made by a French Firm disperse silver iodide crystals. These in turn accelerate precipitation giving the thunderhead no chance to build up hail crystals.

(Chemical and Engineering News. Vol. 32, Page 4352, 1954) [A. M. K.]

Treating Hides and Skins—Effective Control of Leather Beetle: Research has shown an effective way of protecting hides and skins in store from damage caused by the leather beetle. Annually, the hide and skins trade loses enormous amount of money because of the beetles damaging the hides and skins store and reducing their market value. The method of treatment is not only effective but also cheap. Gammexane powder at 2·5 per cent in talc powder dusted to form a thin film on the fleshy side of hides and skins infested with the leather beetle killed 85 to 90 per cent of the pests. The dusting, repeated after 10 days, protects the skins and hides from re-infestation. Four ounces of Gammexane powder mixed in talc is considered to be enough for dusting about six cow or ox hides or about 15

goat hides. Treating 100 hides or double the number of skins will cost about rupees four. 'Wet curing' of raw stock with an adequate quantity of common salt, proper aeration and periodic exposures to day light also go a long way in preventing the beetle attack. (I. C. A. R. Farm News Release No. 7)

Selecting a Dairy Cow—Points to be Remembered: In selecting a cow for milk production the milk record of her mother and the kind of bull to which she is born are the factors which should receive attention. When these are not known, however, the farmer will have to look to certain physical points which will enable him to say whether the cow is going to be a good yielder or not. A dairy cow should have an attractive general appearance, show vigour and a graceful gait. The head should be comparatively small. The body should be well-informed with no excessive fat and having a wedge-shaped appearance with the greatest width between the hips and with the apex at the point of the withers. The udder should be well-developed, extending well forward with the rear attachment high and wide. The quarters of the udder should be evenly balanced, symmetrical and free from lumps of hard tissue. The teats should be uniform, of convenient length and size, well-apart and squarely placed. The udder veins should be long tortuous, prominent and branching. The udder should shrink after milking. The skin should be of medium thickness, loose, pliable and having fine hair over it.

(I. C. A. R Farm News Release No. 9)

Feeding for Milk—Dairy Cows Need Proper Rations: Dairy experts point out that proper feeding is one important factor in increasing milk yield in cows. Many good cows remain poor producers, they say, because of the poor feed given. Fixing up the feed requirements of a milch cow depends upon her needs for maintenance and milk production. But generally speaking, a seer of grain mixture (equal parts of crushed grams, oil cakes and wheat bran) is enough for maintenance. An extra amount of half a seer for every seer of milk yield is considered sufficient. The total quantity, however, should be adjusted to what the cow can actually consume and digest. Heifers should get two to four pounds of grain mixture from one year onwards, in addition to the green fodder given to them. If the fodder is of an ordinary quality, the grain can be increased by one to two pounds. Those that calve early should be fed more liberally during their first lactation so that their growth may not be effected. Pregnant animals should be given an additional half a seer of grain to help them nourish the unborn calf. The addition of an ounce of common salt per day to the feed given is also essential. A liberal supply of clean water given three times a day, and more frequently during the hot season, is also a necessity. (I. C. A. R. Farm News Release No. 10)

Cowpea as Fodder for Increasing Milk Production in Dairy Cows: Cowpea (Lobia) has been found to be a highly nutritious fodder, increasing the flow of milk in dairy cows, especially when fed in the greed pod stage. The crop can be grown pure in the early summer, or mixed with non-legumes like maize or *jowar* in the main summer season. It can either be fed green or converted into silage. Cowpea is especially useful when green forage is generally scanty. It is quick-growing and likes a hot and humid climate. It grows up well on medium to fertile loamy soils, if well-drained, can be used for growing cowpea. Seed is sown in plough furrows with 1 to 1½ ft. spacing Ten to 15 seers of seed will be required for sowing. The crop will be ready for forage in 60 to 80 days and gives an acre-yield of 300 maunds of green stuff. (I. C. A. R. Farm News Release No. 12) [A. M. K.]

'Placement' of Fertilizers-Better Results with Crops than Broadcasting: Extensive experiments conducted in many parts of the world with the mode of application of fertilizers to various crops have shown that increased yields are obtained if the fertilizers are 'placed' at proper distance from the seed. The

method also will entail a saving in the quantity of fertilizers used. Experiments conducted at the Indian Agricultural Research Institute, New Delhi, confirm the fact that this is true under Indian conditions too.

Readily soluble nitrogenous and potassic fertilizers are best 'placed' at a suitable distance from the seed. On the other hand, phosphatic fertilizers give good results when placed close to the seed. Legumes do not like the fertilizers to be too close to them. For quick-growing, shallow-rooted short duration crops, applying the fertilizer in side bands, and for deep-rooted ones directly below the seed are best. For long duration and deep-rooted crops, however, broadcasting the fertilizers, as farmers generally do, is found satisfactory.

Placement of fertilizer has been found particularly beneficial in soils of poor fertility. (I. C. A. R. Farm News Release No. 11)

What they do in the U S. S. R., for higher yields: The Institute of Agricultural Microbiology, U. S. S. R., has worked out an easily applicable method of enriching sodpodzol soils by using A. M. B. This bacterial preparation, created by scientists at the Institute, intensifies the growth of useful micro-organisms, makes the soil more fertile, and raises yields of wheat and other grains by two to three centrers per hectare, potatoes by 25 to 30 centners per hectere and other vegetables by 40 to 50 centres per hectare. In recent years this preparation has won a place in hot house practice too. [Soviet Union No. 4 (50), 1954] [S. J.]

A Preserver for Oranges: Experiments carried out both in United Kingdom and United States of America, have confirmed that diphenyl preserves oranges for at least a period of two months. This substance has antifungal properties and if placed in a case of citrus fruits it sublimes and prevents fruit rotting. Alternatively paper impregnated with diphenyl could be wrapped round the oranges to obtain the same effect. [The autoclave 1953, 5(5), 13]

Systemics in Citrus Pest Control: A systemic insecticide is one that is absorbed into the plant sap and penetrates to all parts rendering them toxic to insects which feed upon them. These are not new to nature as there have been other plants with "built-in" system poisons such as nicotine, sodium fluoro acetic acid ("1080"), pyrethorum and rotenone. From selenium salts known to be systemic poisons since 1936, sodium selenate was developed for the control of mites and a aphis on carnations and roses. B F P O, O M P A or Shrada and Systox, discovered during the war years, by Dr. Shrade of Germany, was released to Agriculture by Pest Control Ltd., after the war.

Systemics are ideal for citrus because, (1) most of the pests like mites, thrips, aphids and scale insects suck up plant juice, (2) the natural enemies of these insects are not harmed, (3) the insecticides are rapidly absorbed and last longer, and (4) only a limited coverage is necessary. These insecticides are used widely on cotton and have not been found in processed oils to any extent. They can be used on ornamental plants, nursery stock and non-bearing fruit trees Systox has now been permitted for use on potato at 3 pint per acre by the U. S. Federal Govt. and on walnuts by the California State. One application of 0.5 to 1 lb. per acre in 400 gal. of water painted on the trunks of mature trees at 0.5 to 2 oz. per tree in Spring gives protection against mites and aphids for 3 months. Destruction of the bark of the trees due to excessive application is now being investigated. With Shardan a higher dosage is necessary but its cost might balance out. [Citrus Grower No. 246, p 4, 1954] [S. K. D.]

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LAUGH OR LEARN

Report Writing: No matter what we do, most of us are interrupted from time to time by the request for a document euphemistically entitled a progress report. Because of their tacit assumptions they are often a source of chagrin to otherwise phlegmatic Scientists, for it is difficult indeed to write some thing about nothing.

Balm for the writhings and groans of the hapless individuals, who must regularly wrestle with a progresss report is now here. Be sure you omit the translations given within brakets.

(Standard progress Report for those with no progress to report). During the report period which ends ....(Fill in appropriate date) considerable progress has been made in the preliminery work directed toward the establishment of the initial activities. (We are getting ready to start, but we haven't done any thing yet). The back ground information has been surveyed and the functional structure of the component parts of the cognizant organisation has been clarified. (We looked the assignment and decided that George would do it.)

Considerable difficulty has been encountered in the selection of optimum materials and experimental methods, but this problem is being attacked vigorously and we expect that the development phase will proceed at a satisfactory rate. (George is looking through the hand book.) In order to prevent unnecessary duplication of previous efforts in the same field, it was necessary to establish a survey team which has conducted a rather extensive tour through various facilities in the immediate vicinity of manufacturers. (George and Harry had a nice time in New York).

Steering Committee held its regular meeting and considered rather important policy matters pertaining to the over-all organizational levels of the line and staff responsibilities that devolve on the personnel associated with the specific assignments relating from the broad functional specifications. (Untranslatable-sorry) It is believed that the rate of progress will continue to accelerate as necessary personnel are recruited to fill vacant billets. (We'll get some work done as soon as we find some-one who knows something)

(Chemical and Engineering News. Vol. 32 Page 4628. 1954)

[A. M. K.]

NEWS AND NOTES

The Valediatory Address of the Agricultural College Students' Club was delivered by Mr. P. A. Nazareth, Additional District and Sessions Judge on 8—1—1955 with Dr. A. Mariakulandai in the Chair. This was immediately followed by the Inter-Class Debates in which the III Year Class stood first thus annexing the Karunakar Memorial Shield.

The Agricultural College Students' Annual Club Day was celebrated on 11th January 1955 under the Presidentship of Sri Nallasenapathi Sarkarai Manradiar, the Pattagar of Palayakottai. The day was marked by many enjoyable events. The whole College began to hum with activities from the crack of dawn to late in the night. There was a grand Tea Party at 5-30 P. M. for over 700 people followed by prize distribution and a variety entertainment.

In the Inter-Collegiate League Matches, the Agricultural College scored the maximum points in Hockey. In Table Tennis the College were the runners up. Inter-Collegiate Athletic meet held at the P. S. G. College of Technology, Coimbatore, on the 22nd and 23rd of January, the College came over second in the total aggregate, with first place in the following events (1) Shotput, (2) Hammer throw and (3) Javelin throw which were all secured by Mr. William Odengo Omamo of Class III.

In the Inter-Collegiate Oratorical Contest in Tamil held by the Rotary Club Messrs. R. M. Alagappan of Class III and C. Gopal of Class I represented the Agricultural College. Sri C. Gopal won the 2nd prize in the Contest.

CROP AND TRADE REPORTS

Crop Statistics – Gingelly – Second Forecast Report – 1954—'55 Madras State: The area under gingelly upto 25th September 1954 is estimated at 236,900 acres. Compared with the area of 225,200 acres estimated for the corresponding period of last year, and an average area of 209,200 acres calculated for the previous five years ending 1953—'54, it shows an increase of 5·2 per cent and 13·2 per cent respectively. The increase in area is attributed to better seasonal conditions at the time of sowing. An increase in area is estimated in the districts of Chingleput, Coimbatore, Tiruchirapalli, Tanjore, Ramanathapuram, Tirunelveli South Kanara. The area estimated is the same as that of last year in the districts of South Arcot, North Arcot, Salem, Madurai and Malabar. The area under the crop in the Nilgiris district is little or negligible. The early crop of gingelly has been harvested in parts of the State. The yield per acre was slightly below normal in North Arcot district.

Crop Statistics – Redgram – First Forecast Report – 1954—'55 Madras State: The area sown with redgram upto 25th August 1954 in Madras State is estimated at 121,000 acres. Compared with the area of 109,100 acres estimated for the corresponding period of the previous year, the present estimate is an increase of 10·9 per cent. Compared with the average area of 104,200 acres calculated for the previous three years ending with 1953—'54, the present estimate shows an increase of 16·1 per cent. The increase in area this year is due to favourable seasonal conditions at the time of sowings. The crop is mainly grown in the districts of South Arcot, North Arcot, Salem, Coimbatore and Tiruchirapalli. An increase in area is estimated in all the districts of the State, except in Salem and Madurai, where the area is the same as that of the last year. The area in Nilgiris district is little or negligible. The yield per acre is expected to be normal in the districts of South Arcot, Salem and Malabar and it is too early to report on the yield in the districts of North Arcot, Tanjore, Madurai, Ramanathapuram and Tirunelvely.

Crop Statistics – Sugarcane – Second Forecast Report – 1954—'55 – Madras State: The area under sugarcane in the Madras State upto 25th September 1954 is estimated at 95,100 acres. Compared with the area of 89,400 acres estimated for the corresponding period of last year, this is an increase of 6·4 per cent. Compared with an average area of 91,100 acres calculated for the five years ending 1953—'54, this is an increase of 4·4 per cent. The increase in area in the current year is attributed to favourable conditions. An increase in area is estimated in all the districts of the State except in Tirunelveli and Malabar districts where the area is the same as that of last year. The area under Sugarcane is little or negligible in the Nilgiris district. The seasonal factor for the State as a whole works out to 97 per cent of the normal as against 93 per cent of the normal estimated for the corresponding period of previous year. On this basis, the total yield for the State in terms of cane works out to 2,527,620 tons, gur equivalent of which is 277,710 tons. Compared with the estimated yield of 2,291,210 tons of cane with a gur equivalent of 251,970 tons for the corresponding period of last year, this is an increase of 11·0 per cent. Compared with the average yield of 245,630 tons of cane calculated for the past five years, this is an increase of 11·3 per cent.

Crop Statistics – Potato – Third and Final Forecast Report – 1953—'54 Madras State: The potato crop is grown mainly in the Nilgiris district and to a small extent in Salem and Madurai districts. The area under potato crop for the year 1953—'54 is estimated at 25,360 acres (9,950 acres under winter and 15,410 acres

under summer crop). Compared with the final area of 20,050 acres in the previous year end an average area of 18,490 acres calculated for the five years ending 1952—'53, this is an increase of 26·5 per cent and 37·2 per cent respectively. An increase in area is estimated in all these three districts of Salem, Madurai and the Nilgiris. The Seasonal Factor for the State as a whole works out to 92 per cent of the normal (95 per cent of the normal for winter crop and 90 per cent for summer crop) as against 90 per cent of the normal in the previous year. On this basis, the total yield works out to 72,910 tons (29,600 tons under winter crop and 43,310 tons under summer crop). Compared with the estimated production of 56,240 tons in the previous year and an average estimated production of 48,410 tons, calculated for the five years ending 1952—'53, the present estimate shows an increase of 29·6 per cent and 50·6 per cent respectively.

Crop Statistics - Cotton - Second Forecast Report - 1954—'55 Madras State: The area sown with cotton in the Madras State upto 25th September 1954 is estimated at 94,900 acres. Compared with the area of 90,600 acres estimated for the corresponding period of previous year and an average area of 83,300 acres calculated for the previous five years ending 1953—'54 this is an increase of 4·7 percent and 13·9 per cent respectively. The increase in area is attributed to favourable seasonal conditions at the time of sowings. The area estimated is the same as that of last year in the districts of North Arcot, Tiruchirapalli, Tanjore and South Kanara and an increase in area is estimated in the other districts of the State except in the Nilgiris. The area under the crop in the Nilgiris district is little or negligible. The estimated area by varieties in the current year together with the corresponding figures for the previous year is given below:

Variety		Area in '00' acres	
		1954—'55	1953—'54
Madras American (Cambodia)		344	327
Madras American (Cambodia - Uganda)		131	124
	Total	475	451
Karunganni		318	305
Tirnuelvelies		140	135
Uppam		12	12
Nadam and Bourban		4	3
	Total	474	455

Weather Review — For the month of December, 1954.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January	Division	Station	Total for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam)	10·3	+ 4·8	46·3	South	Madurai ..	0·8	— 1·2	38·9
	Tirurkuppam*	11·9	+ 6·3	44·8		Pamban	9·1	+ 1·5	36·5
	Vellore	4·9	+ 2·3	31·7		Koilpatti*	4·3	+ 2·4	38·0
	Gudiyatham*	2·6	— 0·9	40·0		Palayamcottai	6·2	+ 2·0	25·8
East Coast	Palur*	8·6	+ 2·8	50·0		Ambasamudram*	7·1	+ 1·1	38·3
	Tindivanam*	5·6	+ 1·7	45·4	West Coast	Trivandrum	4·1	+ 1·6	64·8
	Cuddalore	9·4	+ 1·9	56·5		Kozhikode	0·1	— 1·4	144·9
	Nagapattinam	12·6	+ 1·6	50·1		Fort Cochin	2·0	+ 0·4	117·1
	Aduturai*	10·4	+ 6·7	46·7		Pattambi*	0·4	— 0·9	93·5
	Pattukottai*	7·2	+ 3·4	59·7		Taliparamba*	0·4	— 1·0	156·6
Central	Salem	1·7	+ 0·7	38·0		Wynaad*	0·6	— £	87·7
	Coimbatore (A. M. O.)*	3·0	+ 1·9	28·3		Nileshwar*	0·3	— 0·9	177·6
	Coimbatore	2·3	+ 1·2	32·4		Pilicode*	0·9	— 0·1	168·0
	Tiruchirapalli	3·1	+ 0·5	38·3		Mangalore	0·3	— 0·4	149·1
						Kankanady*	0·3	— 0·3	149·5
					Hills	Kodaikanal	7·3	+ 2·1	59·5
						Coonoor*	4·8	— 2·1	53·8
						Ootacamund*	3·0	+ 0·7	40·2
						Nanjanad*	2·2	+ 0 6	59·1

Note:—1. * Meteorological Stations of the Madras Agric. Dept.
2. £ Actual deviation is 0·04 inches.

The month began with a dry weather that lasted for three days. On the fourth day some scattered showers were received in South Tamil nad. Except for a few localised showers, the weather remained dry during the subsequent three days also. On 8-12-1954 a depression was noticed in the South Bay of Bengal, about 400 miles southeast of Nagapattinam. Under its influence localised showers were received on 9-12-1954 in South Tamilnad. On 10-12-1954 another depression was noticed in the Southwest Bay of Bengal, about 250 miles Southeast of Madras. This depression caused widespread rains in Tamilnad and localised showers in Travancore - Cochin. It came nearer to Madras by about 150 miles and 200 miles respectively in the subsequent two days, causing widespread rain throughout Tamilnad, particularly in Coastal regions. It became weak on 13-12-1954. On 14-12-1954 and 15-12-1954 localised heavy showers were received in a few places in Tamilnad.

On 16-12-1954 a deep depression, probably cyclonic, was noticed in the South Bay of Bengal, 500 miles southeast of Nagapattinam, resultig in localised showers in Tamilnad. On the second day it weakened and transformed into a depression. Two days hence only a low pressure area was observed in this region. Again on 21-12-1954 this low pressure area in the Southwest Bay concentrated into a shallow depression, about 300 miles Southwest of Madras, causing widespread rains in Travancore-Cochin and at a few places in Tamilnad. On the third day it became weak. The remaining portion of the month passed off with practically dry weather except for a few mild localised showers on 26-12-1954 and 27-12-1954.

The note-worthy rainfalls and the zonal rainfall in inches are furnished hereunder:

Note-worthy Rainfalls			Zonal Rainfall			
Date	Name of Place	Rain-fall	Name of Zone	Av. rainfall for Dec.	Dep. from normal	Remarks
10/12/54	Nagapattinam	5·9	North	7·4	+ 3·1	Above normal
10/12/54	Cuddalore	5·4	East Coast	9·0	+ 3 0	do.
10/12/54 } 12/12/54	Madras (Meenambakkam)	3·0 on each day	Central	2·5	+ 1·1	do.
			South	5·5	+ 1·2	do.
do.	Madras (Nungambakkam)	2·0 on each day	West Coast	0·9	— 0·3	Below normal
10/12/54	Pamban	2·4	Hills	4·3	+ 0·3	Just above normal
14/12/54	Kodaikanal	3·9				
15/12/54	Tuticorin	3·5				
22/12/54	Palayamkottai	2·0				

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FACTS AND FIGURES

1. The production of cotton increased from 26.28 lakh bales in 1949-50 to 39.35 lakh bales in 1953-55. In the current year the production is estimated to be 42 lakh bales, which is the Plan target for 1955-56.

2. One hundred and sixty-one pilots were trained in 1953-54 by the 12 Flying Clubs in the country.

3. During the first six months of 1954, 12, 541 tons of paraffine wax valued at Rs. 90,19,296 were exported from India.

4. The estimated percentages of milk utilsed for the production of ghee and butter in India are 43.3 and 6.3 respectively.

5. During the period from October 1953 to March 1954, 142,350 maunds of fertilisers were distributed under the National Extension Service Scheme.

6. During the current year (1954-55), 47,469,000 tons of sugarcane is expected to be produced against the estimate of 42,111,000 tons for 1953-54, showing an increase of 12.7 percent.

[Govt. of India Press Information Bureau, Jan. 3, 1955]

DEPARTMENTAL NOTIFICATIONS

Gazetted Service — Posting and Tranfers

Name and present post	Posted as
Krishna Menon, K. M., Asst. in Chemistry, Coimbatore,	Asst. Agrl. Chemist, Coimbatore.
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Mohamad Basheer, Asst. Entomologist, Civil Supplies, Madras,	P. P. O. Ento. Coimbatore.
Narayanan Nair, K. Asst. Marketing Officer, Trichy,	Asst. Marketing Officer, Coimbatore.
Raman, V. S., Asst. in Cyto-Genetics, Coimbatore,	Cyto-Geneticist, O. S. S., Coimbatore.
Thomas, K. C., D. A. O., Madurari.	D. A. O., Kumbakonam.

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Albuequerque, S. D. S., Asst. in O. S. (On leave)	Asst. in O. S. Nilishwar.
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Editorial

Leo Tolstoy's tale on "Much Land" showed that man's ambition in attaining a ceiling in land-holding has no limit. Acquisition of territory or land has been man's foible, be he Prince or Pauper. From time to time, wars and revolutions have come to level up the high and the low in land wealth. In India, we see in recent years quite a spate of legislation to smoothen out the incongruities that have arisen in course of time through man's ambition to acquire more and more land. In working towards the goal of the Welfare State, both the Central and State Governments of India have given great prominence to Land Reform. Zamindaries, Jagirdaries and other intermediaries have been abolished through Legislation. Attention was subsequently focussed on the elimination of absentee land lordism, on security of tenant and on fair rent. Laws incorporating these reforms have also come to be passed in some of the States in India. In Madras, the T. N. C. C. Sub-committee has again brought Land Reforms into head lines by their recent recommendations on ceilings of individual land holdings. The Travancore-Cochin Government have already gone ahead in this reform. There has been a large volume of opinion expressed for and against this reform in limiting the area of land an individual can possess and cultivate. Those against the reform have put forth the easy question as to why a limitation in land-holding alone should be made, when there is no limitation to the houses, cattle, vehicles, cinemas, mills and above all to the money and the jewels that one can possess. To them this reform seems to be an invedious distinction made against one type of asset. The others standing for the reform have countered this by arguing that Land as a form of asset is limited and is fixed and constant at all periods and for all times, unlike the industrial enterprises and other assets and hence should not be concentrated with a few but be shared by many.

Be that as it may, it is our considered opinion that the real malady of the country is in the small fragmented holdings. The

total cultivated area in this country is estimated at 249 million acres and according to the Planning Commission, land-holdings ranging from 25 to 100 acres comes up to 9 percent of the total agricultural area, after the abolition of the Zamindaris. The bane of the country now is not therefore the large holdings but the "toy and dwarf holdings", which have resulted due to the pressure of the population on the available arable land. According to the recent census figures issued by the Deputy Registrar General of India, 69·8 per cent of India's population are dependent on Agriculture. Of this, 28·5% are self-supporting, 12·5% partly supporting but the bulk 59% are non-earning dependents holding on to Agriculture. Any progressive land reform therefore should first and foremost aim at consolidation of the subdivision, which has resulted through the ages. The class of people grouped as non-earning dependents and who form the bulk of the people in the Agricultural group should be taken out of the land and put to other avocations and their fragmented holdings consolidated. The day is not however far off when with the increase in Industries contemplated in the next Five Year Plan, we should be able to reduce the bulk of the people now dependent on Agriculture and thereby reduce the present pressure on the land.

The Effect of Chemicals on the Growth and Mitosis in Sesamum Orientale Linn (Til or Gingelly)

by

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Introduction: Drugs containing alkaloids are known for their outstanding physiological activity which is based partly on their antibiotic properties, and partly on the inhibition and poisoning of important physiological processes. Since the discovery of Colchicine by Blakeslee & Avery (1937) on the effectiveness of this drug as an agent for inducing chromosome duplication, much work on the effect of allied chemicals on the nuclear cycle has been reported. A review of the recent literature shows that a number of workers have been investigating the various aspects of the different chemicals like colchicine, Acenaphthene, Coumarine, Sulpha-drugs etc. and also the effect of growth promoting chemicals with regard to their activity on the mitosis, growth and cell development. This paper deals with the preliminary observations made during the investigations on the cytological effects of chemicals on the roots of *Sesamum orientale* L.

Material and Methods: Seeds of *Sesamum orientale* with black, brown, white and dull white coloured varieties were taken for study. The chemicals used are:— acenaphthene, α—naphthalene acetic acid. The concentrations used were 1000 p. p. m. (0·001%), 100 p. p. m. (0·0001%) and 10 p. p. m. (0·00001%) aqueous solution for 24 and 48 hrs. duration.

Seeds of Sesamum were grown on moist filter paper in petri dishes until the roots attained a sufficient length for handling. They were then transferred to solutions of different concentrations. Only the roots were actully immersed in the solution. After the required period of treatment, the roots were retransferred to distilled water and carefully washed with water so that the surface of the roots was free from the solution.

The root tips at the end of the treatment, either immediately or after keeping them in distilled water for 24 hrs. were fixed in alcoholic fixative (Acetic Alcohol 1:3). In all the cases only root tip squashes with Feulgen and acetic-orcein were employed.

Observations: (I) EFFECT OF CHEMICALS ON MITOSIS: (a) *Acenaphthene treatment:* When root tips of *Sesamum orientale*

were subjected to acenaphthene treatment at the different concentrations mentioned above for 24 and 48 hrs. duration, no significant effect was noticed in their growth and they were very similar to the control seedlings. But in a few cells there was slight disturbance in mitotic cycle in that there was ineffective clevage and abortive spindle formation. Nebel (1937), Kostoff (1938) have shown that a saturated solution of acenaphthene is effectively used as polyploidising agent in *Allium* and *Lilium*. So a saturated solution of this was applied to the roots and the treatments were given for 24 and 48 hrs. Even then no marked effect was produced by the chemical. The treated seeds were planted after carefully washing in water in small pots in order to observe whether any mutations would be produced. But none of the seedlings survived till the flowering stage. It has been inferred that *Sesamum* plants are not susceptible to the effect of acenayhthene.

(b) $\propto$-*Naphthalene Acetic Acid* (NAA) & β-*Naphthoxy aceticacid treatment:* When the roots were treated with solutions at very low concentrations such as 0·00001% there is an appreciable increase in the mitotic rate, as compared to the control and there is stimulation of the growth of the roots. But at a higher concentration 0·0001% there is definite disturbance in the mitotic cycle. While many cells exhibited normal mitosis, in about 40% of the cases mitotic aberrations were seen.

The chromosomes of a cell undergoing mitosis remain scattered at metaphase instead of being arranged at the equatorial plate. The spindle if already formed at the time of treatment breaks down and the chromosomes do not show movement. Thus in the first stage of mitosis the chromosomes may be seen either scattered or in arrested metaphase or early anaphase positions without being separated. Some degree of contraction of chromosomes also takes place at this stage. The chromosomes then slowly pass into the interphasic condition and affected cell may contain either a single tetraploid nucleus or several nuclei with varying chromosome numbers. Arrested mitosis at anaphase may give rise to cells containing two normal diploid nuclei through failure to develope a complete dividing wall. The paired chromatids are frequently to be seen resulting in restitution polyploid condition. Chromosomes run together to form large, deeply staining pycnotic masses. The cells with high polyploid chromosome numbers were greatly enlarged in size and the walls were sometimes considerably thickened.

When the roots were treated with solution of 0·001% concentration there is a complete cessation of mitosis and an increase in the size of the nucleus and nucleolus. Further it is noticed that the time factor is not of so much consequence as the factor of the chemical used. But the experiments conducted by other workers show that at any concentration the number of 'metaphases' increases with lengthening treatment and with higher concentrations, reaches a maximum and then falls as nuclear disintegration takes place.

(c) *Phenyl acetic acid* (PAA) *treatment:* The effect of phenyl acetic acid on mitosis in the cells of root tips of sesamum was similar to that of other chemicals like α – naphthalene and β - naphthoxyacetic acid. Just like other growth promoting substances PAA also stimulates the cell enlargement and root growth at 0·00001% level as compared to that of control. At 0·0001% concentration there is considerable disturbance in mitosis and at 0·001% level, there is complete inhibition of cell division. Thus the roots of *Sesamum* are highly susceptible to the action of PAA in aqueous medium.

(II) Effect of chemicals on germination and growth :— In order to study the effect of the three chemicals α-NAA and β-NAA and PAA, on the germination of seeds and their growth, they were soaked in three concentrations for 24 hrs, washed with water and kept in moist filter paper in petri dishes and observations made at required intervals. In general it has been observed that sprouting of seeds does not take place if the seeds are treated at 0·001% and a delayed sprouting of seeds at 0·0001%. At concentration of 0·00001% and less, sprouting is initiated even after 12 hrs. of soaking irrespective of the length of treatment and is found to be more significant than over the controls. This effect has been observed only in α-NAA and β-NAA and to a less extent in PAA. It has been found that germination and growth inhibitions are nearly always associated with one another. When seeds in different stages of germination are transferred from water to chemicals, their growth is inhibited. In a very advanced stage they continue to sprout but the radicles degenerate. Generally the roots are much more sensitive than the coleoptile, plumule or young sprouts to the effect of inhibition.

At higher concentrations elongations of the roots cease after a length of about 4–8 mm has been attained. In some cases the

root hair production is also stimulated. But it appears that although meristematic activity is inhibited by the above chemicals, differentiation as shown by root hair formation is unaffected and continues to the root apex. It is noticed that high concentrations cause some swelling of the roots so that the tip of a root which has stopped growing does not retain the dimensions of a normally growing tip, but increases to a thickness which equals or slightly exceeds that of fully differentiated roots of control plants. The hypocotyl swells considerably as seen in colchicine and may even reach thickness 3 to 4 times that of control seedlings. Similar effects have been observed when the seeds were sown in soil in petri dishes moistened with the chemicals.

The present study demonstrates that the effect of the various chemicals is not the same on the different varieties of the same species. The varieties which differ in the colour of the seed coats react differently towards the same chemicals. Kostoff (1938) found that *Vicia*, *Lathyrus* and *Medicago* species were less susceptible to the action of acenaphthene than were oats, barley and other graminaceous species. Levan & Ostergren (1943) also noted that leguminous plants were more resistant to naphthalene derivatives than some grasaes. In *Sesamum* it has been observed that the brown seeded variety is highly resistant to the action of chemicals, while the white seeded ones are highly susceptible to this effect. Hitchcock & Zimmerman (1940) has pointed out from the responses towards rooting of different plants, that the relative effects of chemicals vary considerably according to genera and species. The reason for this differential effect is of considerable value but the principles underlying this differential resistance are yet unknown.

Discussion: It is quite clear that mitotic irregularities are induced by the chemicals acenaphthene, α – napthalene acetic acid, β – naphteoxy acetic acid, and phenyl acetic acid. Such mitotic abberations appear to be closely similar to those reported in the literature due to colchicine and to a range of phenolic and amine compounds. Recent researches on mitotic poisons have demonstrated that two periods of the cellular cycle are outstandingly sensitive to chemical interference – the mataphase or more exactly the formation of a normal anisotropic spindle, and a certain period preceding prophase. The poisoning of the later stage corresponding probably to the increase in the thymonucleic acid content of the chromosomes, leads to nuclear destruction by 'pycnosis'. But there are deviations in effect and in most of the cases in the present

study no tetraploid was observed. The effects characteristic of colchicine which includes interference with centromere division, giving rise to typical paired chromosomes, and spindle suppression causing polyploidy were observed. The multipolar spindles, resulting as interphase nuclei of irregular shape and multinucleate cells seen are believed to be due to partial suppression of spindle action. Under the higher dosage of concentration complete suppression of cell division and in some cases over contraction of chromosomes were observed. Doxey (1949) in onion and rye and showed that morphological effects of the isopropyl phenyl carbamate treatment closely resemble those caused by colchicine and acenaphthene and other known mitotic poisons but were induced by a much lower concentration. Doxey & Rhodes (1949) showed the similarity of effects of acetic acid and of 4 – chloro – 2 methylphenoxy to those of x-radiation and mustard gas.

Koller (1947) has suggested that mitotic abnormalities prevailing in tumours are due to shortage of food and to toxic break down products of the neoplastic tissues. The present study however show that food supply to cells is not affected as the root structure is normal. The effects are more likely to be due to the toxic properties of the compound itself acting either on essential metabolic substrate or by chemical action on the enzymes essential for the processes. This mode of action would correspond with the direct chemical action as suggested by Lavan & Tjio (1948) as opposed to the theory of physical action put forward by Ostergren (1944). Dustin (1947) has considered the action of compounds affecting mitosis and suggests that carbamates interfere with purine metabolism and this would presumably affect the nucleic acid cycle of the cell. The enlarged nuclei and over contracted chromosomes seen in *Sesamum* root tips after treatment at 0.001% provides some evidence to the theory suggested by Dustin (1947). The evidence from the present study points out to the conclusion that interference with nucleic acid metabolism is primary or major cause of the mitotic irregularities.

All authors who have tried to elucidate the physiological action of different chemicals and extracts containing inhibitors have found that inhibition is accompanied by a stimulation of germination and growth. At sufficiently high dilutions, the inhibition of chemicals is replaced by stimulation. In the present study it has been noticed that at 0.001% concentration suppression of cell

division would be sufficient to prevent growth thereby promoting inhibition. At lower concentration 0.0001% rate of cell division is reduced and growth rate is also likely to be reduced. But the cell division may be prevented when polyploid tissues develop; cell enlargement continues though not in proportion to increase in chromosome number. Audus & Quastel (1948) observed that a concentration of 0.001%, sulphanilamide and sulphapyridine were more toxic to root growth than sulphaguanidine and sulphathiazole at the same concentration. Doxie (1249) has noticed with isopropyl phenyl carbamate similar effects on onion and rye with higher concentrations as well as lower concentrations. At concentration of 0.00001% there is marked tendency for the seeds as well as root tips for their germination and growth respectively. This indicates that stimulation takes place at very low dilutions. This relation between inhibition and stimulation can be explained in one of the three ways: (1) The same substance inhibits in high and stimulates in low concentrations. This is in agreement with well known fact that hormones and poisons inhibit at high and stimulate at low levels. The action of different dilutions of these chemicals seem to confirm this supposition. (2) Inhibition and stimulation are caused by two different substances whose action varies with respect to the concentration of the chemicals. The action of the inhibitor is sensitive to varying concentrations of the chemicals, while the action of the stimulator does not alter with the changes in the concentration of the chemicals. (2) The inhibitor is transformed into a stimulator by a chemical change during germination.

SUMMARY.

Growing roots of *Sesamum orientale* L. were treated with acenaphthene, α – naphthalene acetic acid, β – naphthoxy acetic acid, and phenyl acetic acid at concentrations of 1000, 100 and 10 p. p. m. for 24 and 28 hrs. Root tips were fixed and squash preparations made. Effects described include interference with spindle mechanism formation of multipolar spindles and enlargement of nucleoli. The effects are compared with those of colchicine. The effects of these chemicals on germination and growth are discussed.

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* Original note seen.

Studies on Seed-Borne Fungi of Rice

by

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Introduction: The paddy crop is subjected to a number of diseases both in the seedbed and in the mainfield. Most of the trouble arises as a result of either using diseased seed material or the seed is attacked by the microflora present in the soil. The damage becomes very serious when soil and weather conditions favour the growth and development of the harmful microflora of the seed and soil. As a result of infection, there is seed decay resulting in the failure of germination of seed, destruction of young seedlings before emergence (pre-emergence blight) and even the seedlings that emerge out survive in a weakened state until they finally succumb to some trouble or other (post-emergence blight). The damage to seedlings is quite enormous resulting in the non-availability of sufficient seedlings and at times even necessitating the raising of seedlings again.

Object: The present study was undertaken at the Agricultural College, Bapatla, with the following objects in view: (1) to determine the commonly associated fungi of the paddy seed and (2) to study the effect of seed-borne fungi on the germination of seed and emergence of seedlings.

Materials and Methods: The seed material used in the investigation was obtained from ten rice research stations distributed all over the state (composite state of Madras and Andhra), each station representing an important rice growing belt. From each station seed samples of three popular varieties were obtained. The seedlings were raised in mud pots of the size 9″×9″, using pulverized clay soil collected from paddy fields. The soil was well powdered, sieved and sterilized at thirty pounds pressure for two hours whenever sterlized soil was used. The sowings in all the experiments were done with seeds selected at random at the rate of 25 seeds per pot.

The epiphytic microflora of the seed samples was determined by the centrifugal method. The seeds from each variety were picked at random and transferred to a clean test tube. In each tube 10 c. c. of sterilized water were added, vigorously shaken for five minutes and the water extract transferred to centrifuge tubes.

The sterlized water extracts of the seed samples were centrifuged in a Clay Adam's centrifuge for ten minutes. After centrifuging, the supernatant liquid was decanted and the sediment examined under the microscope for the presence of fungal spores or other characteristic fruiting bodies of the fungal flora.

The determination of endophytic fungi was done by the use of agar plate method. Fifty seeds selected at random from each variety were surface sterilized with mercuric chloride (1:1000) for three minutes and washed with five changes of sterlized water. The seeds were spaced equidistantly in oats agar medium in Petri dishes and the plates were incubated at laboratory temperature (mentioned in the proper context). Throughout the investigation Petri dishes of ten centimeters only were used. The mycelium arising from the colonies around each seed, on the third or fourth day, was transferred to fresh agar slants. The cultures were further purified, if necessary, and the purified cultures were maintained in oats agar medium.

All the cultures, excepting *Piricularia* and *Sclerotium* used in the investigation, were isolated and purified in this laboratory from the seed samples obtained from different localities. The two cultures viz., *Piricularia and Sclerotium* were kindly supplied by the Government Mycologist, Coimbatore. The cultures when required for inoculation purposes, were multiplied on 50 c. c. of oats agar medium in 250 c. c. Erlenmeyer flasks for two weeks and then used as inoculum. A sterlized water suspension of the spores or sclerotia of the respective fungi were prepared and surface sterilized seed of MTU. 3 were treated with fungi for half an hour. After treatment, the seeds were dried on a clean drying sheet and then sown in pots containing sterilized soil.

Experimental: Seed-borne diesases are responsible for serious losses in almost every crop grown from seed. It is, therefore, important to test the seed before sowing regarding its freedom from diseases. The object of testing the seed is not only to determine the seed-borne infections but also to control them, if found in time, by some kind of seed treatment. It is also desirable to determine whether the infection is only superficial (epiphytic) or whether it penetrates more deeply into the seed (endophytic). In general the epiphytic infections occur more frequently than the endophytic ones and can be effectively controlled by seed treatment.

The observations were recorded on the germination of seed, emergence and vigour of seedlings. The germination of seed on the fourth day of sowing was taken as the basis for determining the percentage of emergence was obtained by recording the number of seedlings that have emerged completely and growing vigourously on the tenth day of sowing and the total number of seeds germinated in each pot. The results are presented in table 3.

TABLE 3.

Effect of seed-borne fungi on the germination of seed and emergence of seedlings.

No.	Name of fungus		Percentage of germination	Percentage of emergence	*Remarks
1.	*Chaetomium*	..	52	100	
2.	*Curvularia*	..	54	100	
3.	*Helminthosporium*	..	42	80	
4.	*Fusarium*	..	42	68	
5.	*Piricularia*	..	50	88	
6.	*Sclerotium*	..	60	84	
7.	*Sphaeropsis*	..	58	80	
8.	Control (Untreated)	..	88	100	

*The results obtained from both the pots were identical and the percentages given above represent the average of two pots.

It will be seen from the above data that the percentage of germination was affected in varying degrees by different fungi. The two parasitic fungi viz., *Fusarium* and *Helminthosporium* have caused failure of germination of seed to a marked extent while there was only slight reduction in germination percentage with *Piricularia, Chaetomium,* and *Curvularia.* The effect of *Sclerotium* and *Sphaeropsis* on germination was negligible in comparison with other fungi. The results also indicated that the emergence of seedlings was appreciably affected only by *Fusarium* while other fungi viz., *Helminthosporium, Sphaeropsis, Piricularia* and *Sclerotium* have affected the emergence only to a small degree. The normal emergence was not affected by *Curvularia* and *Chaetomium.* It was further observed that only those seed-borne fungi that are known to cause serious diseases on paddy like *Fusarium* and *Helminthosporium,* are capable of causing damage to seed and young seedlings while the saprophytic seed-borne fungi are not likely to cause any damage, under optimum conditions for the normal germination of seed and the growth of seedlings.

Discussion: Several investigators have reported that the fungi associated with seeds are responsible for bringing about reduced emergence and seed decay. Many fungi have been reported to cause pre-emergence seedling blights. These troubles are further aggravated when the weather and soil conditions favour the growth and development of seed and soil-borne fungi. A number of fungi are able to attack the grains, and Padwick (1950) includes *Piricularia oryza*, *Cochliobolus miyabeanus*, *Trichoconis padwickii*, *Gibberella zeae*, *Neovossia horrida*, *Ustilaginoidea virens* and *Nigrospora* spp. in that list. He has also listed some of the fungi that have been more frequently observed or isolated from the grains. Mundkur (1946) reported, after examining the diseased specimens of leaves and seeds collected from all over India, said to be affected by *Helminthosporium oryzae* (*C. miyabeanus*), that there was a preponderance of *Curvularia* spp. He also concluded that in all probability, the *Curvularia* spp. are responsible for losses similar to those caused by *H oryzae*. In the present investigation the determination of epiphytic fungal flora by the centrifugal method has revealed the presence of many fungi viz., *Helminthosporium*, *Curvularia*, *Fusarium*, *Alternria*, *Nigrospora*, *Piricularia* and several groups of moulds. But among these, there was a preponderance of *Helminthosporium* only over others and *Curvularia* was met with less frequently. The prevalence of other fungi was only of stray occurrence and observed only on some varieties.

The isolations of endophytic fungi by agar plate method yielded species of *Curvularia*, *Helminthosporium*, *Fusarium*, *Chaetomium*, *Sphaeropsis*, *Piricularia* and various moulds particularly species of *Aspergillus*. In this case there was a preponderance of *Curvularia* spp. over other fungi. *Helminthosporium* was also isolated readily from most of the varieties but less frequently than *Curvularia*. The other fungi were encountered in small degrees with few varieties only. It is evident from the results obtained that almost all varieties are infected with *Helminthosporium* and *Curvularia* to an appreciable extent and to a lesser degree with *Fusarium*. The other fungi isolated in the course of the investigation, excepting *Piriularia* which is mainly an air-borne parasite, are only saprophytes and are not known to cause any serious damage to paddy crop. Therefore a knowledge of the most commonly prevalent types of fungi on the seed material will be of immense help in devising the most economic and effective method of seed treatment.

The data regarding the effect of fungi isolated from seed material, on germination of seed and emergence of seedlings, revealed that *Fusarium* and *Helminthosporium* have markedly affected the germination of seed. The other fungi viz., *Chaetomium*, *Curvularia*, and *Piricularia* have affected the germination only to a small extent. The seedling emergence was affected to an appreciable degree only by *Fusarium* and to a little extent by *Helminthosporium*, *Piricularia*, *Sphaeropsis* and *Sclerotium*. The indications obtained with *Helminthosporium* and *Fusarium* in reducing the germination percentage and emergence of seedlings are in conformity with the results reported by other workers. Padwick (1950) stated that seeds infected with *H oryzae* germinate poorly resulting in the wastage of some proportion of the seed. As a result of infection by *H. oryzae*, Ocfemia (1922) recorded a seedling mortality of 10 – 58 per cent in Philippines while Tucker (1927) recorded 15 per cent mortality and seedlings in Puerto Rico. Ito and Kimura (1931) reported from Japan that although accurate estimates of losses due to *Gibberella fujikuroi* (*Fusarium moliniforme*) are not known, they are frequently as high as 20 per cent or more, mainly in the seedbed but partly in the field. Thus the indications arrived at in this investigation emphasize the need for a critical examination of the seed material to ascertain the nature of the fungi present so that the most effective method of control can be devised.

Cralley and Tullis (1937) stated that rice seedling blight is a disease complex encountered in all rice growing tracts and the severity of seedling blight depends upon weather conditions and the microflora of the seed and the soil. They have further stated, that in Arkansas there was a tendency for the seedling blight to occur when the soil temperature was unfavourable for the rapid germination of the seed and maximum growth of seedlings. Tisdale (1922) stated that wet condition of the soil checked the normal growth of seedlings and favoured the development of the fungus resulting in the destruction of the seed. The results obtained in this investigation have indicated that only parasitic seed-borne organisms can cause damage to seed and young seedlings while the saprophytic seed-borne fungi are likely to be harmful only under conditions of temperature and soil moisture unfavouroble for the normal germination of seed and development of seedlings. In the light of these findings, the evidence of sowing, at a time unfavourable for the germination of seed and development of seedlings,

eventhough the seed material is free from parasitic fungi, is a practical point of considerable importance to cultivators.

Summary: 1. The determination of epiphytic fungal flora by the centrifugal method, from thirty different varieties of paddy collected from all over the state, revealed constant association of the following fungi viz., *Helminthosporium*, *Curvularia*, *Fusarium*, *Alternaria*, *Nigrospora*, *Piricularia* and various groups of moulds.

2. The isolation of endophytic fungal flora by agar plate method repeatedly yield the following fungi viz., *Curvularia*, *Helminthosporium*, *Fusarium*, *Piricularia Chaetomium*, *Sphaeropsis* and different groups of moulds particularly species of *Aspergillus*.

3. Among the several fungi isolated from different varieties, only two parasitic seed-borne fungi., *Helminthosporium* and *Fusarium* are found to cause adverse effects on germination of seed and emergence of seedlings.

4. The saprophytic seed-borne fungi viz., *Curvularia*, *Chaetowium* and *Sphaeropsis* are not likely to cause serious damage under optimum conditions for the normal germination of seed and the growth of seedlings.

Acknowledgement: The investigation was carried out at the Agricultural College, Bapatla, during 1953-54 as part of the research items of Mycology Section. I wish to express my sincere thanks to Sri T. S. Ramakrishnan, M. A., F A. SC., the then Government Mycologist, Coimbatore, for his helpful suggestions and critically going through the manuscript,

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Table I. *Showing different genera of epiphytic fungi associated with seed.*

Table II. *Showing different genera of fungi isolated by agar-plate method.*

			Table I: Genera of Fungi							Table II: Unsterilized Seed			Seed Sterilized with 0·1% Hg I_2							Seed treated with Agrosan GN
No.	Station	Name of variety	Helmintho-sporium	Curvularia	Fusarium	Alternaria	Nigrospora	Piricularia	Moulds	Rhizopus	Moulds	Bacteria	Curvularia	Helmintho-sporium	Piricularia	Chaetomium	Sphaeropsis	Fusarium	Moulds	Moulds
1	Aduthurai	ADT 3	+				++	+		++	+ A	+	+++		+					
2		,, 20	+			++				++	+ A		++			+	+	+		+ R
3		,, 22	+		++	+	+			++	+ R	+	+				+			+ R
4	Ambasamudram	ASD 1	+							++			+	++						
5		,, 5	+		++					++		+	+					+		
6		,, 6	+		+				+ A	++	+ R		+	+				+	+ A	
7	Anakapalle	AKP 2	++	+						+++			++	++					+ A	
8		,, 4	+			+				++			++	++					+ P	
9		,, 11	+						+ P	++			+++	+					+ P	
10	Bapatla	MTU 7					+			+++	+ P	+	++						+ R	
11		,, 12														++				+ R
12		,, 19		+			+									++				
13	Buchireddipalem	BCP 1	+			+	+			++	+ R					++				+ A
14		BCP 2				+	+	++					++	+						
15		,, 3	+										++			+				
16	Mangalore	Haliuga		+						+	++ P	+	++						+ A	
17		Keyama	+							+	+++ A	+	+			+	+		+ P	
18		Muscathy		+	+				+ P	+	+ P	+	+				+		+ R	
19	Maruteru	MTU 1	+						+ P	++				+					+ P	
20		,, 3	+		++					++			+	+				++		
21		,, 5	+		+				+ A	+				+		+				
22	Pattambi	PTB 2	+	+					+ A	++			+						+ A	
23		,, 7							+ A	++			+			+				
24		,, 10		+					+ P	+			++							
25	Samalkota	SLO 2	+		++		+			+++		+	+	+		+				+ R
26		,, 13	+			+	+			++	+ R			+		+				+ A
27		,, 15	+	+									+++							+ A
28	Tirurkuppam	TKM 3	+							+++		+							+ A	
29		ADT 22	+		+		+			++	+ P		+	+						
30		CO 19	+	+						++	+ A			+				++		

Note (Table I):
+ = Presence of stray spores.
++ = Presence of few spores.
+++ = Presence of large number of spores.

Note (Table II):
+ = Isolated from less than 5% of the seeds.
++ = Isolated from less than 40% of the seeds.
+++ = Isolated from more than 80% of the seeds.

A = Aspergillus.
P = Penicillium.
R = Rhizopus.

A Short Note on the Influence of Season and Soil on the Life Period of Cane

These studies were started in 1949 and continued for a season with the object of determining the best time for planting and harvest to obtain good quality of cane with a high yielding variety, namely, Co. 419. The experiments were conducted by the Superintendent, Liaison Farm, Kulitalai in collaboration with the Government Agricultural Chemist.

Planting was done at intervals of a month. The canes were harvested in the following year and yield data were recorded.

In the matter of yield (Table I) canes planted in August recorded significantly better yields namely 44·82 tons while those planted in September gave only 32·04 tons. There was difference due to the variation in the period of harvest.

The juice was analysed periodically for sucrose and purity (Table II). From the data it will be seen that there is no marked difference due to treatments in the quality of juice.

TABLE I

Summary of results — Major Treatments

Time of planting	Yield of cane per acre		As % on control	No. of canes harvested per acre	C. C. S. in tons per acre
	In tons	In maunds			
August	44·82	1219	100	28,434	4·61
September	32·04	871·4	71·49	26,895	3·37

"Z" test is satisfied.

S. E. of treatment mean		0·64 tons	17·31 maunds
Critical difference	P – 0·65	1·64 tons	44·64 maunds

Conclusion : August. September.

N. B.: C. C. S. means Commercial Cane Sugar.

TABLE II

Periodical juice analysis – time of planting and harvest trial

Kulitalai - August Planting

Time of Planting	Time of harvest	May % Sucrose	May % Purity	June % Sucrose	June % Purity	July % Sucrose	July % Purity	August % Sucrose	August % Purity
August	July	12·88	79·16	14·87	82·43	15·83	82·49	15·30	75·67
	August	12·73	78·68	14·41	82·72	16·49	86·97	15·57	78·60
	September	14·46	82·25	14·87	82·89	16·44	85·80	15·89	76·62
September	July	12·61	78·06	13·29	80·44	11·43	62·53	15·36	80·25
	August	12·12	77·79	14·63	82·56	16·27	87·51	15·24	83·19
	September	11·01	74·39	14·98	87·91	15·59	84·36	15·99	78·34

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GOVT. AGRICULTURAL CHEMIST.

Threshing of Paddy with Tractor

Excepting a few, almost all the ryots may wonder when they are informed that paddy sheaves can be very economically threshed after the first hand-threshing, by means of rubber tyred tractor. This was largely demonstrated in the farm of Sri S. Ramalingasamy, M. A., B. L., at Papanad, Tanjore District.

The sheaves of the produce of half an acre were spread round to a radius of 14 feet leaving an empty space at the centre to a diameter of 8 feet.

The tractor used was a W. 6. McCormick Deering which was run over the sheaves in the fourth gear at a speed of $5\frac{3}{8}$ miles per hour. The action of the tractor wheels in motion seems to be that the two front wheels by their quick turning action agitate the sheaves in front while the two rear wheels push the sheaves slightly behind due to their centrifugal force and at the same time rub the sheaves against the ground due to which action the grains shed down from the ears. The tractor took only ten minutes for the threshing operation during which the entire grains and chaff too had got separated from the ears.

It has been observed that working the tractor at the fourth gear at a speed of $5\frac{3}{8}$ miles per hour, gives good results, since the stirring and rubbing action by the wheel movement would be much better at this speed than when the tractor moves at less speed.

The shedding of the grains was cent percent even when the sheaves had been spread to a thickness of 9 inches. The only necessary factor for achieving this good result is to take up the sheaves twice during the tractor operation by one or two men with the aid of a two pronged stick.

Ten minutes are required before and after the tractor threshing for spreading the sheaves and removing them respectively. Thus only half an hour was required for completing the entire operation, right from spreading the sheaves to the collection of grains from the floor. Since more time is required for sweeping the grains from the floor if two floors can be had side by side, the threshing operation can go on uninterrupted without wastage of time as the tractor can thresh in the second floor while, the first one is being swept and cleaned. The produce of one acre can be threshed in an hour and in a day of 8 hours eight acre produce can be easily handled. When there are two threshing floors produce of 16 acres can be handled in a day of 8 hours This turnover can be even doubled if the tractor is worked in the night with its lights on. This would mean really a boon to Tanjore mirasdars, who often

find it very difficult to complete the second threshing operation of Kuruvai paddy with cattle as either rains interfere during October–November or the Thaladi ploughing collides with the threshing work. Kuruvai straw cannot be stacked for a long time unlike the Samba varieties, as it gets spoiled in the rains, and hence it is necessary to thresh the sheaves soon after the hand threshing, which can be achieved only by the tractor.

In the case of cattle threshing the sheaves are spread at intervals, one pile over the other as the cattle go round and round. Therefore, the final collection of straw also is done in stages and there is always the chance of throwing away some of the grains along with the straw as the shed grains are embeded between layers of straw without all of them going to the bottom as in the case of Tractor threshing, for which the entire sheaves are spread once only at the beginning and all the grains are forced to the very bottom.

The following is the comparative statement showing the time taken, percentage of shedding of grains and chaff and cost of threshing.

	Tractor Threshing		Cattle	Remarks
	Single threshing floor	Double threshing floor	Threshing	
1. Quantity threshed in a day of 8 hours	Produce of 8 acres	Produce of 16 acres	Produce of 4 acres	Variety of paddy used
2. Percentage of shedding of grains	100%	100%	95%	was Adt. 20
3. Percentage of shedding of chaff	99%	99%	75%	
4. Cost of threshing one acre produce	Rs. 2—4—0	Rs. 1—2—0	Rs. 1—8—0	

From this comparative statement it would be clear that the cost of threshing by Tractor on double threshing floor is the cheapest and the time taken by Tractor is only one fourth of what is taken by cattle. This saving in time is a very great factor in Tanjore district where the number of sunny days during the Kuruvai harvest season is few and the cattle labour is also scarce. And the private tractor owners find more work for their machines whose idle period too is reduced to the minimum.

Tanjore.

T. P. SHANMUGANAINAR,
Agricultural Engineering Supervisor.

Maturity of Potato Seed Tubers : Its effect on yield

The potato crop is ready for lifting when the haulms completely dry up and die down, indicating full maturity. At this stage the jacket adheres firmly to the flesh of the tubers and peeling of the skin in minimum during harvest. But in western countries, if the standing seed crop exhibit any considerable virus infection, the tubers are lifted before they are fully mature, to prevent the disease from being conveyed to the future progeny by descension through the haulms at maturity.

In their studies made at Wye, Rothamsted and Harper Adams College and using certified seed obtained from Scotland, Blackman and Brown *(1) concluded that there was very little to choose between the crops raised from mature and immature seed. While immature seeds from virus-infected stock showed comparatively less infection in the progeny, any other special merit due to the immaturity of the seed itself was not evident. Very little reliable evidence is available on this point from the results of recent workers, though Brandreth and Dallas *(2), after studies on yields resulting from different lengths of the growing seasons with three varieties, viz., Epicure, Ninetyfold and Arran Pilot, concluded that lifting early varieties before they were mature gave markedly lower yields.

Details of trials at the Agricultural Research Station, Nanjanad: During the four-year period, 1948–'51, trials were conducted to find out if any improvement in yield could be obtained by the use of immature seed. Great Scot, the popular, commercial variety of the Nilgiris, which comes to maturity in 105 days after planting, was used. A duration of 75 days, when the leaves and the haulms begin to first change from green to yellow, was fixed as the stage for the lifting of the immature tubers for use as seed.

The trials, laid out under A B B A design with 12 replications, were run for a total period of ten seasons and the yield values obtained are recorded below :—

SUMMARY OF RESULTS

Season		Mean acre yield in lb from A (Mature seed)	Mean acre yield in lb from B (Immature seed)	Standard Error	'Z' test satis-fied or not	C D. (P=0·05)
1948						
1. Main crop	..	15917	16718	592	No	..
2. Second crop	..	12792	10995	344	,,	..
1949						
3. Main crop	..	9181	6806	400	Yes	960
4. Second crop	..	6350	5533	400	No	..

* (1)—(2) See page 70.

Season		Mean acre yield in lb. from A (Mature seed)	B (Immature seed)	Standard Error	'Z' test satisfied or not	C. D. (P=0·05)
1950						
5. Irrigated crop	..	1850	1900	130	,,	..
6. Main crop	..	14500	14666	280	,,	..
7. Second crop	..	6233	7333	360	Yes	792
1951						
8. Irrigated crop	..	3100	8566	888	,,	1956
9. Main crop	..	7933	7366	134	No.	..
10. Second crop	..	7334	5334	960	,,	..

Conclusion: Main crop, 1949 .. A, B
Second crop, 1650 .. B, A
Irrigated crop, 1951 .. B, A

There were no significant yield differences between the two treatments for seven out of the ten seasons. For the remaining three seasons, mature seed was found superior for one season only and immature seed for two seasons.

The results revealed that there was no special or inherent benefit of lifting an immature crop for use as seed. On the other hand, tubers lifted before full maturity always undergo a lot of skinning while lifting and this results in a decline of their market value and keeping quality. Hence, under the Nilgiri conditions, it is concluded that early lifting of the crop before maturity is not useful.

Acknowledgement: The above experimental data were compiled from the Madras Agricultural Station Reports (1948–'49 to 1951–'52) and from the results of the work of the staff during that period. This is gratefully acknowledged.

Agricultural Research Station,
Nanjanad

M. D. AZARIAH,
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GLEANINGS

Chemistry of Baldness: Primary of immediate causes of human baldness obviously include poor nutrition of the hair root and adjoining portion of the follicle where keratinisation takes place, according to Amos E. Light of Wellcome Research Laboratories. Speaking before the scientific section of the Toilet Goods Association he declared that poor nutrition could result from a lowered blood supply to that region, thus limiting the supply of amino acids and various enzymes needed for proper hair development. Secondary and systemic conditions possibly affecting hair growth include such factors as blood pleasure, vessel wall tension, and diameter of the blood vessels, says Light. Also of possible effect are the estrogenic, thyroid. adrenocortical, and pressor hormones. Other possible factors causing hair changes are age, exposure of the scalp to the elements, mechanical, bacterial, and chemical irritation. muscular activity of the scalp, and diet including the intake of facts, vitamins, minerals, and calories. An upset sex hormone balance can affect hair growth. Methyl testosterone appears to increase connective tissue development at the expense of the vascular supply to the vicinity of the hair roots. A pressor agent such as serotonin liberated during lengthy periods of mental or even physical stress could contract portions of the cappillary bed of the scalp. The male hormones could enable enough extra connective tissue to be formed to interfere permanently with the blood supply. Research for the future should include a study of various ways to predict oncoming baldness, Light says. Co-operation with insurance companies and medical clinics might enable various physical and physiological conditions to be associated statistically with baldness Preventative measures causing dilation of the scalp capillaries and increased blood flow should be evaluated. This should include the study of mechanisms for introducing desired chemicals into the scalp, such as by hypospray techniques and by ointment bases. One recent report says that an orally administered vasodilator related to nicotinic acid has caused some growth.

(Chem. and Eng. News, 32, 5038, 1954).

[A. M. K.]

Urine is a Good Manure: Practical way of using it in Villages: The country can produed over 15 million tons of extra grain, if all human urine is utilised for manuring crops, according to agricultural scientists Human urine is a very rich source of nitrogen, but no attempts are being made by farmers to conserve it for the crops.

Special designs of urinals are being recommended to farmers to serve the dual purpose of sanitation and conservation of the urine as manure,

The idea in the design of one of the commonly recommended urinals is below-surface soaking of urine in a variety of materials. Commonly available absorbing material like soil, sand, ash, charcoal dust, sawdust, dry leaves, paddy husk, spent tea leaves, chopped straw, dry dung and waste paper are used. Bad smell is reduced to the minimum.

A drum type urinal can be easily put up. The drum is filled with any of these materials. The voided urine is conveyed from the mouth of the urinal through a tube buried six to nine inches deep inside the drum When the entire material is thoroughly saturated with urine, it is removed and spread out in a thine layer to dry in the sun. Or better, dumped in a pit and covered with loose earth. The drum filled again with fresh material

[ICAR Farm News Reliese No. 13]

Better returns with Green Manures: Simple Rule to follow: Farmers have come to realize the value of ploughing in a green manure crop before a grain crop is raised, and the practice is gaining popularity everywhere

Yet, the full benefits of green manuring cannot be had unless farmers follow three simple rules in the application of green manures, crop scientists point out.

The green manure crop should be used at a stage when it is still succulent and not yet turned fibrous. Secondly, a period of six to eight weeks should elapse between the ploughing in of the green matter and the sowing of the next crop. The other equally important rule to be followed is to see that enough moisture is in the soil to allow the green matter to decompose and the next crop germinate. If too little rain is received, the field will have to be given irrigations to satisfy this condition. [ICAR Farm News Release No. 15]

Treating Lesions: More Rapid Cure for Foot and Mouth: A rapid cure can be effected in cattle suffering from Foot and Mouth disease, if the lesions in the mouth and the feet are treated with antiseptics.

Foot and Mouth is one of the most common diseases affecting cattle in the country, and spreads very fast.

The common antiseptics recommended for treating lesions in the mouth are potassium permanganate solution in the proportion of 1 : 1000 or three per cent alum solution and for the lesions in the feet a mixture of coal tar and copper sulphate.

Infected premises should also be thoroughly cleaned and disinfected with 1.2 per cent caustic soda or 4 per cent washing soda, and as far as possible, all contaminated material should be burnt. [ICAR Farm News Release No. 17]

Dehorning of calves: There are three ways of dehorning calves, namely, chemical, cautery or hot iron and mechanical.

(1) Chemical dehorning with (a) Caustic sticks: Calves up to two weeks can be treated with caustic soda or caustic potash. The latter is preferred as the former is likely to injure the surrounding tissues. An area the size of two rupee coins should be clipped over each 'button' a ring of vaseline about one inch wide is next smeared around the clipped area to check the caustic from running into the calf's eyes. The caustic stick is then moistened and rubbed over the button with a gentle rotary motion and the rubbing continued until blood just starts to seep through the smeared spot. The caustic should be applied to the area of the skin covering the horn bud. The caustic is injurious to skin and clothes. The user should either wear rubber gloves or use a paper wrapping for safe handling.

Afterwards, the calf should be tied up for atleast six hours in a place where it cannot get wet. This will prevent scratching and rubbing of the treated area, which is likely to cause burning in other places and blindness if the caustic gains access to the eyes.

(b) Antimony Trichloride: Antimony Trichloride in a solution of flexible collodion has been found to be a very satisfactory dehorning agent.

The solution can be made up by any chemist from the following formula :-

Antimony Trichloride 28% Salicylic acid 7% and Flexible collodion 65%

The material is easy to apply and dries quickly and there is no danger to the eyes.

The hair around the buttons is clipped, the 'button' cleansed with methylated spirit and the solution is applied using a brush. The animal need not be tied up. The solution gives best results, if applied in the first nine days of life. After this period, it can be used fairly successfully if the top of the buttons is cut off with a pair of sharp curved scissors.

Cautery of Hot iron method: An altenative method of dehorning young calves is by the application of a special searing iron over the horn bud.

Mechanical Method: Calves up to three months old may be treated by taking out the centre of the horn bud by means of a special instrument or a sharp knife. This may be followed with advantage by the application of searing iron.

Queensland Agricultural Journal Vol. 79, p. 236, 1954.

[K. S. S. and A. M. K.].

Record yield of Ragi in an Alkaline Field at Agricultural Research Station. Palur: Field number 53 in garden land area at Agricultural Research Station, Palur is highly alkaline and it was found that no garden land crop was coming up well in the field. The crops which were sown or planted in that field were very stunted in growth and they developed patches where the plants died and the yields recorded were very poor. During the last two seasons daincha-crop was raised and the whole green matter was incorporated in situ by turning it in with a victory plough. A crop of Co 5 ragi was raised during the May to September season in 1954–55 and it has given a record yield of 2044 lb. grain per acre thus proving the suitability of ragi to alkaline soils and also the role played by daincha in reclaiming alkaline land. [D. A's. News Letter for March 1955]

Cropping Rice Fallows with Early Cottons: The need for stepping up the production of cotton without affecting the area under food crops cannot be overemphasised. Of the various avenues explored to achieve this subject, the utilisation of rice fallows for cultivation of cotton ranks foremost.

In Madras State, bulk of the paddy area remains fallow from the month of January till the onset of South West monsoon. During paddy season, the fields are practically flooded and especially in Tanjore Delta, due to high water table, there is storage of underground water which could easily be tapped by inexpensive methods. Thus the fallow period from January to June–July could be fitted in with a suitable variety of cotton which will produce ¾ to 1 bale of long staple cotton per acre.

The problem of raising a short duration and quality cotton in the fallow period has been successfully solved by the recent introduction of P. 216. F, an early Punjab American variety which comes up in 4½ months and possesses a staple length of nearly one inch and found capable of spinning upto 40"s H. S. W. C.

Soon after the harvest of paddy, sowing of cotton in paddy stubbles can be taken up immediately without waiting for preparation of the land. Four or five seeds are dibbled per hole and 25 lb. of seeds are required for sowing one acre. It has been found from experiments that closer spacing of 1½ ft. between rows and 4½" between plants in the row gives 35–40% increased yield over the usual wider spacing of 2½' x 9" adopted for cotton.

The seeds may be treated with cow dung and red earth paste for facilitating easy dropping of seeds and quicker germination. It will be highly desirable if seeds are treated with Agrosan GN (1 gram per 15 lb. of seeds) which will wards off seed borne diseases. In areas irrigated by tanks and wells, the fields may be well prepared after harvest of paddy, ridges formed and sowing done.

The germination is complete in about a week and ween the plants attain a height of about 6", the paddy stubbles may be removed, plants earthed up and manuring done with 100 lb. Ammonium sulphate per acre. A second dose of 100 lb. Ammonium Sulphate per acre may be applied during flowering time. Manuring with Ammonium Sulphate contributes to increase the yields considerably. Irrigations should invariably be given after application of fertilizers. Regular irrigations depend upon the rainfall and weather conditions. Inter-cultivation like weeding and hoeing helps to keep off weeds and also facilitates an unhampered growth of the cotton crop.

Incidence of pests like jassids and leaf rollers can be effectively controlled by dusting cotton dust.

Variety P. 216. F. which appears to be cosmopolitan, yields upto 1000 to 1200 lbs. per acre under normal conditions, thereby giving the ryot an additional income of R. 200 /- per acre. With the extension of cultivation of cotton to nearly 8 lakh acres of rice fallows in Tanjore delta alone, the production of cotton for spinning 40 counts in this State can be increased by about 4 lakh of bales which will go a long way to increase the production of quality cotton in this State.

[D. A's. News Letter for March 1955]

Sun as Sterilizer: Easy Treatment of Seed against Disease: The sterilizing effect of the sun can be made une of for keeping the smut disease of wheat in check. The disecse is found wherever wheat is grown and causes heavy loss of grain. In the sun treatment the infested wheat grain is immersed in water at ordinary room temperature for four hours. Infested wheat comes from field in which black heads have appeared. The seed thus soaked is spread out for drying in the sun. The grain is thoroughly dried and stored till required for sowing. The practice gives excellent results wherever the temperature of the sun is high. Where it is low, the seed after soaking in water should be spread on a concrete surface, which is hot enough to kill the fungus causing the decree. This treatment of seed is successfully applied to control loose smut in barley and grain smut of *jowar* with good results at the Indian Agricultural Research Institute, New Delhi. [I.C.A.R. Farm News Release No. 19]

Checking White Ant Attack: Method of using Repellant with Irrigation: Farmers having white ant trouble in their field will get good relief if they use Crude oil emulsion with irrigation water. Crude oil emulsion is used in the form of a solution in the proportion of one pound of the emulsion in four gallons of water. This can be used for irrigating the infested plants, also the semi-solid emulsion can be placed in the irrigation water by putting the soil in a gunny cloth and placing it in the flowing current. Since the repulsive smell of the emulsion lasts only for a few days, the operation has to be repeated after eight to ten days. Instead of crude oil emulsion, five per cent kerosene emulsion may also be used. Clean cultivation, removing the stubbles away from the field after harvest, deeper ploughing and following crop rotations are other methods suggested that help in removing the white ant trouble. [I.C.A.R. Farm News Release No. 20]

CROP AND TRADE REPORTS

Crop Forecast - Paddy 1954 - '55 - First Report - Madras State: The area sown with paddy upto 30th September 1954 in the Madras State is estimated at 2,893,000 acres. Compared with the corresponding estimate of 2,825,000 acres, this is an increase of 2.4 per cent. The area estimated in the current year is the same as that for the last year in the districts of Salem and the Nilgiris. An increase in area is estimated in all the other districts of the State. The first crop of paddy has been or is being harvested on an extensive area in the districts of Tiruchirapalli, Tanjore, Tirunelveli and Malabar. Ths out-turn of these harvests is reported to be fair. In the other districts except the Nilgiris, harvests on a restricted area were reported and out-turn reported as generally fair. The condition of the standing crops in general is reported to be fair. More rains are reported to be needed particularly in the districts of Chingleput, South Arcot, North Arcot, Salem and Coimbatore to augment the water supply in irrigation sources and to sustain the standing crops.

The wholesale prices of rice, Second sort, per standard maund of 92 2/7 lb. (equivalent to 3,000 tolas, as reported from some important market centres on 8—10—1954 was Rs. 14—14—0 at Kumbakonam, Rs. 15—9—0 at Cuddalore, Rs. 16—1—0 at Madurai, Rs. 16—12—0 at Tuticorin, Rs. 17—0—0 at Tanjore, Rs. 17—5—0 at Erode, Rs. 17—13— at Salem, Rs. 18—2—0 at Mangalore and Rs. 20—4—0 at Kozhikode. Compared with the prices prevailing during the corresponding period of the previous year, the present prices reveal a fall of 40.8 per cent at Madurai, 34.0 per cent at Mangalore, 33.4 per cent at Cuddalore, 33.3 per cent at Tanjore, 21.7 per cent at Tuticorin, 16.5 per cent at Salem and 14.5 per cent in Erode, The price at Kumbakonam and Kozhikode have remained stationary.

Cholam Crop - 1954 - '55 - First Forecast Report: The area sown with Cholam (Jowar or Sorghum Vulgare) upto 25th September 1954 is estimated at 751,300 acres. Compared with the area of 747,200 acres estimated for the corresponding period of the previous year, this is an increase of 0.5 per cent. The increase is due generally to favourable seasonal condition in the year under review. Cholam is not grown in the districts of South Kanara and the Nilgiris. The area estimated is the same as that for last year in the districts of Chingleput and Malabar. A decrease in area is estimated in the districts of Salem and Tiruchirapalli and an increase in the other district of the state. The condition of the standing crop is reported to be generally fair.

Cumbu (Bajra) - 1954 - '55 - First Forecast Report - Madras State: The areasown with Cumbu (Bajra or Pennisetum Typhoideum) upto 25th September 1954 is estimated at 709,000 acres. Compared with the area of 699,5000 acres estimated for the corresponding period of the previous year, this is an increase of 1.4 per cent. The increase is due to favourable season this year. Cumbu is not grown in the districts of Malabar, South Kanara and the Nilgiris. The area sown in Tanjore is estimated to be the same as that in the previous year, A decree in area is estimated in the districts of North Arcot, Salem, Madurai and Tirunelveli and an increase in the other districts of the State. The early sown crop has been harvested in the districts of North Arcot and Salem and the yield obtained was reported to be below normal. The condition of the report is reported to be generally fair.

Ragi - 1954 - '55 - First Report - Madras State: The area sown with ragi (Eleusine Coracana) in the Madras State upto September 1954 is estimated at

5,75,400 acres. Compared with the area of 563,000 acres estimated for the corresponding period of the previous year, this is an increase of 2.2 per cent. The increase is due generally to favourable seasonal conditions. The estimated area is the same as that for last year in the districts of South Arcot and Malabar. A decrease in area is estimated in the districts of Madurai, Tirunelveli, South Kanara and the Nilgiris and an increase in the other districts of the State.

Cotton - Third Forecast Report 1954 - '55 - Madras State : The area sown with cotton upto 25th November, 1954 is estimated at 612,500 acres. Compared with the area of 592,900 acres estimated for the corresponding period of the previous year, this is an increase of 3.3 per cent. Compared with an average area of 570,700 acres for the five years ending with 1953-54, this is an increase of 7.3 per cent. The increase in acreage in the current year is mainly attributed to favourable seasonal conditions. The area estimated is the same as that of last year in the districts of Chinglepuut, South Arcat, North Arcot, Tanjore and South Kanara and an increase is estimated in the other districts of the State except in the Nilgiris District where the area under cotton is little or negligible. The crop was affected by want of adequate rains in the latter stages of its growth. North Arcot District and by insect pest in Coimbatore District. The condition of the crop in the other districts'is generally satisfactory. The seasonal factor for the State as a whole works out to same as that of last year being 97 per cent of the normal. On this basis, the total yield works out to 201,400 bales of 392 lb. lint as against 197,200 bales of 392 lb. lint for the previous year and an acreage yield of 180,100 bales for the five years ending with 1953-54, representing an increase of 2.1 per cent and 11.8 per cent respectively. It is however too early to estimate the yield with accuracy as much will depend upon the future weather conditions.

The wholesale price of cotton lint per standard maund of 82 2/7 lbs. or 3,200 tolas as reported from certain important market centres on the 4th December, 1954 was Rs. 94—11—0 for Coimbatore cambodia, Rs. 86—14—0 for Coimbatore Karunganni, and Rs. 70—14—0 for Tirunelvelies. Compared with the prices which prevailed during the corresponding period of the previous year, these prices reveal an increase af 3.4 per cent in the case of Coimbatore Karunganni, 109 per cent 1.9 in the case of Coimbatore Cambodia and a decrease of 8.8 percent in the case of Tirunelvelies.

Pepper - Second Forecast Report - 1954 - '55 - Madras State : The area under pepper upto 25th December, 1954 in the districts of Malabar, South Kanara and the Nilgiris is estimated at 119,350 acres (101,900 acres in the district of Malabar, 17,300 acres in South Kanara district and 150 acres in the Nilgiris district). Compared with the area of 117,630 acres (101,000 acres in the district of Malabar, 16,500 acres in South Kanara district and 130 acres in the Nilgiris district) estimated for the corresponding period of the last year, it shows an increase of 1.5 per cent. The Seasonal factor is estimated at 92 per cent of the normal for Malabar district, 88 per cent of the normal in South Kanara district normal in the Nilgiri district, as against 90 per cent of the normal in Malabar and South Kanara districts and 95 per cent of the normal for the Nilgiris district, estimated for the corresponding period of the last year. On this basis, the total yield is estimated at 9,200 tons (7910 tons in Malabar district, 1,280 tons in South Kanara district and 10 tons in the Nilgiris district). Compared with the yield of 8,930 tons (7670 tons in Malabar district, 1250 tons in South Kanara district and 10 tons in the Nilgiris district) estimated for the corresponding period of last year it shows an increase of 3.0 per cent. The wholesale price of pepper per maund of 82 2/7 lb. on 3200 tolas on 8—1—1955, was Rs. 105—13—0 for Nadam and Vatakkan varieties, Rs. 123—6—0 for Wynad variety at Kozhikode

Rs. 1,030—14—0 at Tellicherry and Rs. 101—3—0 at Mangalore. Compared with prices in the corresponding period of the previous year, i. e. those which prevailed on 9—1—1954, these prices show a fall of 62.8 per cent in Mangalore, 51.4 per cent for Nadam and Vatakkam varieties 46 2 per cent for Wynad variety in Kozhikode and 52.4 per cent at Tellicherry.

Onions – First Forecast Report – 1954 -'55 – Madras State: The area sown with onions in the Madras State upto 25th December, 1954 is estimated at 21,100 acres. Compared with the area of 18,900 acres estimated for the corresponding period of last, this is an increase of 11.6 per cent. The area estimated is the same as that of last year in the districts of Chingleput, North Arcot, Tanjore, Tirunelveli and the Nilgiris. An increase in area is estimated in all the other districts of the State except in Malabar and South Kanara district where the acreage under the crop is little er negligible. The yield per acre is estimated to be normal in the districts of South Arcot, Salem, Tanjore, and the Nilgiris and slightly below normal in the other districts of the State. The seasonal factor for the State as a whole works out to 97 per cent of the normal which is the same as that for last year. On this basis, the total yield works out to 102,200 tons as against 91,500 tons estimated for the corresponding period of last year representing an increase of 11.7 per cent. The average wholesale price of onions per maund of 82 2/7 lb. or 3,200 tolas as reported from important market centres on 8—1—1955 was Rs. 4—3—0 in Tirunelveli, Rs. 6—5—0 in Wallajah, Rs. 6—0—0 in Mangalore and Rs. 3—10—0 in Tuticorin. Compared with the prices which prevailed on 9—1—1954, these prices reveal a decrease of 41.5 per cent in Mangalore, 39.6 per cent in Tuticorin, 35.0 per cent in Tirunelveli and 19.2 per cent in Wallajah.

Ginger – Second Forecast Report – 1954 -'55 – Madras State: The area under ginger crop upto 25th December 1954, in the districts of Madurai, Malabar, South Kanara and the Nilgiris is estimated at 14,880 acres. Compared with the area of 15,250 acres estimated for the corresponding period of the last year, it shows a decrease of 2.4 per cent. Compared with the average area of 12,610 acres for the previous five years ending with 1953–5,4 the present estimate reveals an increase of 18 0 per cent. A decrease in area is estimated in the district of Malabar and an increase in the other districts. The yield per acre is expected to be normal in the districts of Malabar, South Kanara, and the Nilgiris and below normal in the Madurai district. On this basis, the total yield is estimated at 5310 tons of dry ginger. Compared with the estimate yield of 5440 tons of dry ginger for the corresponding period of the last year, it shows a decrease of 2.4 per cent. Compared with the average yield of 4350 tons of dry ginger for the previous five years ending with 1953–54, the present estimate reveals an increase of 22.1 per cent. The wholesale price of dry ginger per standard maund of 82 2/7 lb. or 3200 tolas at important market centres, on 8—1—1955 was Rs. 79—5—0 for Charmad variety, Rs. 76—6—0 for Ordinary variety at Kozhikode, and Rs. 88—2—0 at Mangalore. Compared with the prices for the corresponding period of the previous year, (i. e. those which prevailed on 9—1—1954) these prices show an increase of 56.9 per cent for Charnad variety, 62.5 per cent for ordinary variety at Kozhikode and 84.6 per cent in Mangalore.

Samai – 1954 -'55 First Forecast Report – Madras State: The area sown with Samai (Panicum Miliare) upto 25th September 1954 in the Madras State is estimated to be 212,100 acres. Compared with the area of 2 4,300 acres estimated for the corresponding period of the previous year. this is an increase of 3.8 per cent. The increase is due generally to favourable seasonal conditions in the year under review. The area estimated is the same as that for last year in the districts of Madurai, Ramanathapuram, South Kanara and the Nilgiris. Samai

is not grown in the Tanjore district. A decrease in area sown with samai is estimated for Salem distritt and an increase in the other districts of the State. The crop has already been harvested in Malabar district and the yield obtained is reported to be normal. The condition of standing crop is reported to be generally fair.

Korra - First Report - 1954 - '55 - Madras State: The area sown with Korra (Tenai or Setaria Italica) up to Seplember, 1954 in the Madras State is estimated at 42,700 acres. Campared with the area of 43,500 acres estimated for the corresponding period of the previous year, this is a decrease of 1·8 per cent. The present estimate shows an increase of 3·6 per cent as compared with the average area of 41,200 acres for the five years ended 1953–54. Korra is not cultivated in the district of South Kanara. Sowings of the crop have not yet commenced in the districts of Tanjore and Tirunelvelli, where this crop is grown to a small extent. The area estimated is the same as that for the previous year in the districts of Tiruchirapalli, Ramanathapuram, Malabar and the Nilgiris. An increase in area is estimated in the districts of South Arcot, North Arcot and Coimbatore, and a decrease in the other dist.icts viz. Caimgleput, Salem and Madurai. The condition of the standing crop is reported to be generally fair.

Varagu - First Report - 1954 - '55 - Medras Stste: The area sown with Varagu (Paspalum Scrobiculatum) in the Madras upto September 1054 is estimated at 291,500 acres. Compared with the corresponding estimate of 278,300 acres for the previous year, this is on increase of 4·7 per cent. The area estimated is the same as that for last year in Tirunelvely district. A decrease in area is estimated in the districts of Salem, Tiruchirapalli and Madurai and an increase in the other districts of the State except South Kanara and the Nilgiris where the crep is not raised. The condition of standing crops is reported to be generally fair.

FACTS AND FIGURES

One cheap and effective way of preventing river bunds being washed away by seasonal floods in planting such grasses as *Kusha*, Giant Star and Thin Napier. The grasses bind the soil and keep the bunds intact.

* * *

Eggs meant for hatching should be stored in a room free of smell such as of onions, kerosene oil, etc. The eggs should be stored with their large end up.

* * *

Serving a cow soon after calving results in a low conception rate. The best way would be to avoid mating the cow during the two heat periods following calving.

* * *

There are 1·51 million acres under coconut in India annually producing coconuts valued at Rs. 78/- crores. Two-thirds of the area is in Kerala.

* * *

In the present day crop production over 70 per cent of the cultivated area is cropped with cereals as against less than 5 per cent with pulses Pulses are nitrogen recuperating crops, and should be included in the cropping programme to a greater extent.

—[I.C.A.R. FARM NEWS RELEASE NOTE].

Weather Review — For the month of January, 1954.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam)	4·6	+ 3·2	4·6
	Tirurkuppam*	4·9	+ 3·7	4·9
	Vellore	1·8	+ 0·3	1·8
	Gudiyatham*	1·8	+ 1·4	1·8
East Coast	Palur*	2·6	+ 0·3	2·6
	Tindivanam*	0·5	— 1 0	0·5
	Cuddalore	1·9	— 0·5	1·9
	Nagapattinam	2·7	J. N.	2·7
	Aduturai*	1·1	— 0 6	1·1
	Pattukottai*	3 2	+ 1·3	3·2
Central	Salem	0·1	— 0·2	0·1
	Coimbatore (A. M. O.)*	0·3	— 0·2	0·3
	Coimbatore	0·6	J. N.	0 6
	Tiruchirapalli	0·8	J. N.	0·8

Division	Station	Total for the month	Departure from normal	Total since 1st January
South	Madurai	0·3	— 0·5	0·3
	Pamban	5·2	+ 2·6	5·2
	Koilpatti*	2 5	+ 1·5	2 5
	Palayamcottai	1·9	+ 0·2	1·9
	Ambasamudram*	4·9	+ 1·8	4·9
West Coast	Trivandrum	0·3	— 0·5	0·3
	Fort Cochin	0·1	— 0·8	0·1
	Kozhikode	2·0	J. N.	0·2
	Pattambi*	Nil	— 0·1	Nil
	Taliparamba*	Nil	— 0·2	Nil
	Wynaad*	Nil	— 0·4	Nil
	Nileshwar*	Nil	— 0·2	Nil
	Pilicode*	Nil	— 0 2	Nil
	Mangalore	Nil	— 0·3	Nil
	Kankanady*	Nil	— 0·1	Nil
Hills	Kodaikanal	2·4	— 0·8	2·4
	Coonoor*	4·4	+ 0·4	4·4
	Ootacamund*	0·9	+ $£_1$	0·9
	Nanjanad*	0·7	— $£_2$	0·7

Note :—1. * Meteorological Stations of the Madras Agric. Dept.

2. $£_1$ Actual figure is 0·04.
3. J. N. = Just Normal.
4. $£_2$ = Actual figure is 0·01.

The weather in the first three days of the month was practically dry except for an isolated heavy fall of 3·3" at Pamban on 3—1—1955. The next day very light showers were received at a few places in Coastal Tamilnad. In the subsequent three days weather was mainly dry. On 8—1—1955 an active zone of convergence was noted extending from Trivandrum to Madras, with the result that showers were moderately widespread in South Tamilnad. Fairly widespread showers were received in different parts of Tamilnad in the succeeding three days. Then again the weather became dry and remained so for three days with the exception of a few light showers in Coastal Tamilnad on 14—1—1955. A few places in North Tamilnad had some showers on 15—1—1955 and the weather in the rest of the region was dry.

On 16—1—1955 an active easterly wave was found approaching Coastal Ceylon and South Coastal Tamilnad. The remaining portion of the month upto and inclusive of 28—1—1955 passed off with practically dry weather with the exception of a few localised showers in South Tamilnad. Even these light showers in South Tamilnad were received at intervals of two to three days, when bright sunny weather was experienced. In the last three days the weather was mainly dry throughout the Madras State.

The note-worthy rainfalls and the zonal rainfall in inches are furnished hereunder:

Note-worthy Rainfalls			Zonal Rainfall			
Date	Name of Place	Rainfall	Name of Zone	Av. rainfall for Dec.	Dep. from normal	Remarks
3/1/55	Pamban	3·3	North	3·3	+ 2·2	Above normal
9/1/55	Madras (Nungambakkam)	2·0 on each day	East Coast	2·0	— 0·1	Just Below normal
9/1/55 } 10/1/55 }	Madras (Meenambakkam)	1·5 on each day	Central	0·5	— 0·1	Below normal
9/1/55	Cuddalore	1·0	South	3·0	+ 1·1	Above normal
do.	Kallakurichi	1·0				
10/1/55	Kodaikanal	1·0	West Coast	0·1	— 0·3	Below normal
21/1/55	Nagapattinam	1·0	Hills	2·1	— 0·1	Just above normal

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore.

C. B. M. & M. V. J.

FIELDMEN'S ASSOCIATION, LAWLEY ROAD P. O., COIMBATORE

The Annual General Body Meeting for the year 1954 of the Fieldmen's Association, was held on 3—2—55 under the Presidentship of Sri C. S. Narayanaswamy Iyer.

The following persons were elected as office-bearers of the year 1955:

Sri S. Kalyanasubramaniam of Paddy Section as President.

Sri A. Adiapatham of Cotton Section as Secretary.

Sri Venktanarasimhan of Mycology as Assistant Secretary and Treasurer.

Messrs. M. Saravanabhavanandam of Paddy Section, Ponnuswamy of Oil Seeds Section, Venktaramanan of Fruits Section, Sri Krishnaswamy Naidu of Millets Section, Ranganathan and Rajamani of Entomology Section as Committee Members.

A. ADIAPATHAM,
Secretary.

DEPARTMENTAL NOTIFICATIONS

Gazetted Service — Postings and Transfers

Name and present post	Posted as
Abraham. Dr. P. Plant, Physiologist, Coimbatore,	Officer, in Spl. Duty, (Spices), I. C. A. R.
Kalyanasundaram, N. V., (On leave)	Agronomist, Satyamangalam.
Krishnamurthy, R.,	Cotton Extension Officer, Madurai.
Krishnaswami, P. N., Cotton Extension Officer, Madurai,	Asst. Cotton Specialist, Coimbatore.
Kunhiraman Menon, Asst. in Chemistry, Coimbatore,	Asst. Agrl. Chemist, Tanjore.
Kunhikoran Nambiyar, A., Asst. Millets Specialist, Coimbatore,	Millets Specialist, Coimbatore.
Nayer, P. N., (On leave)	Asst. Marketing Officer, Trichy.
Narayanaswami, S., Asst. Agl. Engineer, Ootacamund,	Asst. Soil Conservation Officer, Ooty.
Syed Mohmad, P. P., D. A. O., Madras,	For Services in Pondicherry.
Thomas, K. C., D. A. O., Madurai,	Asst. Marketing Officer, Madras.

Upper Subordinates — Postings and Transfers

Name and present post	Posted as
Abubucker, D. Agl. Lec., Gandhipuram,	A. D., Wandiwash.
Achuthan Nair, E., (On return from deputation,	P. P. A., Myco. Tellichery.
Alagamuthu, N., A. D., Cuddalore,	To Work in Pondicherry.
Balasubramaniam, V., O. S., Asst. Nileshwar,	Coconut Nursery Asst. Pattukottai.
Bakthavathasalu, Fruit Asst. A. D. T.,	Statistical Asst. in Meteorology, Coimbatore.
Doraiswami, G., A. D., Bhavani,	A. D., Coimbatore.
Ganesha Pillai, S., F. M., C. F., Coimbatore,	F. M., Bhavanisagar.
Gopalakriahnan, S., Asst. in P., Physiology, Coimbatore,	Groundnut Physiologist, Coimbatore.
Jayaraja, R., Agrl. Lec., Pattukottai,	P. P. A., Mycol., Pattukottai.
Krishnamurthy, C., F. M., Satyamangalam;	F. M., Bhavanisagar.
Kannain, Asst. Cotton Specilist, Coimbatore,	Cotton Asst. Coimbatore.
Kuruvilla, M. J., P. P. A., Tellichery,	Spl. A. D., Lower Bhavani Project, Satyamangalam.
Krishnamurthy, N., A. D., Gingee,	To Work in Pondicherry.
Lingannan, K. A. D., Conjeevaram,	Agrl. Engineering Supervisor, Tellichery.

Name and present post	Posted as
Nagarajan, S. S., Pady Asst. Coimbatore,	Asst. Groundnut Physiology, Coimbatore
Narasimalu, T. R., Soil Conservation, Kothamangalam,	Agrl. Engineering Supervisor, Mayuram.
Parthasarathy, D. R., A. D., Avoor,	A. D., Keelamangalam.
Radhakrishnan, T., P. Physiology Asst. Coimbatore,	Chemistory Asst. Coimbatore.
Ramanarayana Menon, K. O. S., Asst. Nileshwar,	Analyst, Coimbatore.
Ranganathan, K. S., A. D., Coimbatore,	O. S. Dev. Asst. Coimbatore.
Rajagopalan, M., A. D., Vridhachalam,	To work in Pondicherry.
Rajan, M. Spl. A. D., Lower Bhavani, Satyamangalam,	A. D., Bhavani.
Sundararaj, M. S., A. D., Tirupur,	Fruit Asst., Coonoor.
Sahadevan, P. C. (on leave)	Asst. in Paddy Coimbatore.
Shanmugam, C. T., A. D., Madurantakam,	O. S. D. Asst., Pollachi.
Sankara Subramaniam, C. K., P. A. to D. A. O., Tirunelvelly,	F. M., Bhavanisagar.
Sivasubramaniam T., S. D. A., Guindy,	F. M., C. F., Coimbatore.
Somalingam R., A. D., Madanam,	Agrl. Eng. Supervisor, Kumbakonam.
Thejamurthy, P. S., A. D., Mailam,	To work in Pondicherry.
Venkatrama Iyer, A. D., on leave,	A. D., Tindivanam.
Venkatarangam, R., P. P. A. Myco. Pattukottai,	Spl. A. D., Vellore.
Veeraraghavan, S. N., A. D., Vedasandur,	Agrl. Lec. Gandhigram.
Venkateswaran, A. N., Groundnut Nursery Asst. Pattukottai,	Asst. Groundnut Physiology, Coimbatore.

Supplement to the Madras Agricultural Journal

Marketing Committee Chronicle

Regulating the Marketing of Groundnuts in North Arcot District

by

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Many have asked the question as to what exactly are the functions of the Market Committees constituted under the Madras Commercial Crops Markets Act 1933, and what their achievements are. In this article, the problems of the North Arcot Market Committee, which began functioning from November 1953 are briefly discussed just to give an idea of the role of market committees, indicating also as to what better marketing regulations can do.

The two main functions enjoyed under the Madras Commercial Crops Markets Act, on the North Arcot Market Committee are (i) to provide for the better regulation of buying and selling of groundnuts in North Arcot district and (ii) the establishment of markets for the commercial crops notified, namely groundnuts. Groundnuts include both the pods (unshelled) and kernels (shelled). Better regulation of the groundnut trade necessarily means the licensing of traders, so as to obtain from them, the necessary information regarding their transactions. These data obtained from the licensees enable a study of the flow of trade. In North Arcot, where nearly $1\frac{1}{2}$ lakh tons of groundnut pods are produced annually, mostly as a rainfed crop, coming to harvest in the months of October to December it is common for all and sundry, who have some surplus money to spare, to invest it in the purchase of groundnut pods, stock it for some time and sell it at the higher prices, if possible, being a commodity which can readily be sold. These intruders in the groundnut trade, mostly avoid taking licences and payment of levy fees to the market committee as also taxes due to Government as they are casual purchasers of small quantities. Such unlicensed traders have the potentiality to upset the normal trend of the trade, by selling their produce in a panic at cheaper prices, in a falling market, as they lack the staying power. The prices of groundnut reacts to the export demand, and the local prices are never steady, with the result that it has become a paradise of the gamblers. Licensing under the Madras Commercial Crops Markets Act rigourously keeps out hectic investors and the groundnut market is bound to be more steady in due course.

There are a number of malpractices in the groundnut trade at present in North Arcot district. At Vellore 179 lb. of kernels are weighed instead of the standard 177 lb. per bag for which the prices are offered. These two pounds of kernels in each bag would cost at the present rate, nearly seven annas, which is a loss to the grower. These frauds in weighment are checked by licensed 'weighmen'. The staff of the committee, visit the trading premises frequently and see that correct weighments are ensured. Gradually, the practice of weighing correctly, and at the rate of 177 lb. per bag of kernels, would be well established.

Purchases of pods are being made at present by volume measures. According to the Madras Commercial Crops Markets Act, transactions by weighments only are allowed. As per volume measures, 64 Madras measures of pods go to make a bag, for which the price of a 80 lb. pods bag is paid. Actually these 64 measures of pods weigh up to 90 lb. even, according to the excellence of the produce. In the volume measurement, good quality produce is not paid its proper price. A loss of at least 4 lbs. per bag on an average, come to nearly fourteen annas, which is sustained by the farmer when he sells a bag of pods, by volume measure. The Committee staff is educating the ryots to sell the pods by weight only and is also trying to check traders in this practice, by the enforcement of the provisions of the Act.

Pods are sold by the ryots in North Arcot district in a wet condition, soon after harvest. The prices paid for wet pods are considerably low. At present, a bag of wet pods (64 Madras Measures) is purchased only for about Rs. 8/- while the dry pods bag (64 Madras Measures) is sold at Rs. 11/- nearly. A gain of Rs. 3/- per bag is effected by the traders, on the purchase of these wet pods, while they approximately loose by driage at best 8 Madras measures per bag which would work out to only rupee one in terms of money. Hence, the net gain to the trader for each bag by purchasing wet pods is roughly estimated as Rs. 1—12—0 taking into consideration the cost of processing the pods. The ryots are being advised to sell only as dry pods after drying in their places. so that they may gain this amount.

The producers would stand to gain by marketing their produce, after processing as far as possibie. The shrewd trader, always estimates the losses in processing, in excess only and to that extent, the agriculturist is the loser. The percentage out turn of kernels to pods by weight on a commercial scale, is about 68 in the case of bad pods, 71 to 72 for good pods of the spreading variety and 72 to 73 for good pods of the bunch variety, in North Arcot district. Generally, the trader calculates on the basis of 9 bags of pods to three bags of kernels, (one candy of 531 lbs.), when the produce is very good, which works out to a percentage outturn of 70, while actually it is anywhere about 72 or 73. This underestimate of 2% works out to nearly twelve annas per bag

of kernels which is the loss sustained by the grower while marketing his produce as pods instead of kernels. The loss is more, if the pods are wet, as the trader is sure to estimate the loss of moisture, at a safer level advantageous to him. The pods received in the markets of the North Arcot district during October 1954 were poor in quality, as there were no rains in September and the traders took advantage of the same, and began purchasing pods on the basis of 11 bags pods for 3 bags of kernels. Actually, when decorticated, it worked out at the rate of 10 bags pods per candy of kernels. Again the price of 9 bags of pods at Rs. 11/- at present per bag, works to Rs. 99/- only, and along with Rs. 1—8—0 for decorticating charges amounts to Rs. 100—8—0 per candy of kernels while the present price is about Rs. 105/- to 108/-. Hence, the ryot loses nearly Rs. 6/- per candy or Rs. 2/- per bag of kernels when he sells it as pods. Further, the grower would gain more, if he should market his produce as kernels, as the space required for kernels is less, and hence, he can carry more bags to the market in his bullock cart, than he is able to do in the case of transport of pods. The South Arcot ryots bring only kernels to the market for sale. Such practice is being advocated by the market committee staff in North Arcot district.

The above are some of the problems tackled for the regulation of the trade in groundnuts in North Arcot district. The provision of regulated markets in the important assembling centres for enabling the producers to market their produce direct to the consumers or exporters, avoiding the long chain of middleman, as obtaining now, is the other important objective, which has been tackled, by establishing a regulated market each, at Vellore and Tiruvannamalai. The Government recently sanctioned the opening of three more regulated markets at Tirupattur, Arni and Arcot. These five markets would benefit the trade evently throughout the district. In these regulated markets, any one can bring his produce for sale and have the services of the market committee for disposing of the same by auction. The service is free. At present, the village and the itinerant merchants, procure the produce from the grower, bring it to the big traders in the towns, who in turn, have it sold to the consumers like the oil crushers or to the exporters. There are brokers in between, at times and with such an array of traders in the marketing of groundnuts, it is no wonder, the grower gets only about 70% of the consumer's price. When the produce is marketed through the regulated markets of the committee, the price spread shows that the producer gets nearly 90% of the consumer's rupee.

"Biligotu" or "Chali Supari" (Mature, whole, sun dried Arecanuts) of South Kanara

by

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Arecanut (*Areca catechu*) though grown over an area of only 23,707 acres in the district of South Kanara, plays yet an important role in the economic welfare of a large number of villages especially some of the interior villages of the district where, even lands which could not usefully be utilised for any other crop production, have been brought into flourishing arecanut gardens with the result that the district is to-day exporting over 2,00,000 cwt. of arecanuts per year valued at over three crores of rupees. It is the only area in the country where practically the whole of the production is harvested when the nuts are fully ripe and converted into "Chali supari" which is in great demand in Northern and Central India. "Chali supari" of Mangalore is noted for its superiority over nuts of North Kanara and parts of Malabar and is found to have better demand and better prices.

Preparation. The nuts are harvested when they turn yellowish on the tree and are fully ripe. These are immediately spread evenly on a level ground for sun-drying and dried thus for 40 days with regular turning of the individual nuts to enable uniform drying. A regular watch has to be kept during the period which will cost about Re. 1/- per Cwt. of nuts on an average. The nuts are then husked at Re. 1/- per Cwt. and the inferior and blackened nuts separated and sent to the market for sale.

Transport. There are regular goods transport lorry services available from practically every part of the district and the cost of transport is Rs. 1—8—0 per Cwt. on an average.

Assembling. The main or practically the only assembling centre for arecanuts in the district is Mangalore which is the only export market. Though there are a few dealers who purchase the produce from the growers in the interior villages, the whole quantity finally is sent to Mangalore for sale and export.

Marketing. There are a number of commission agents at Mangalore with sufficient number of godowns to stock and arrange for the sale of arecanuts received from the villages. The sale is done under cover of cloth with a number of shippers bidding at the sales. The commission

agent not only gives advances on the produce brought for sale through him but also gives credit to the shippers on his own responsibility. "Supari" trade may be said to be one of the major trade transactions in the Mangalore market. The commission for the sale is paid by the grower which is now fixed at Rs. 3—8—0 per cwt. by the regulation of the Market Committee. This commission includes all the charges including godown rent, weighment, etc. The produce is sold as received from the growers without any further grading or sorting.

Shipping. The shipper immediately on purchase fumigates the arecanuts with sulphur-dioxide, then grades it through sizers for the different consuming markets mainly into four grades:

1. Moti special – 1" and over in diameter.
2. Srivardhan special – 0.9" and over but below 1".
3. Jamnagar special – 0.8" and over but below 0.9".
4. Jeeni special – under 0.8".

All discoloured and broken nuts etc. are handpicked and separated. The nuts are now ready for shipment. These are generally packed in new double gunnies, stitched, marked and tied over with coir ropes. The average expenditure by the shipper is Rs. 7/– per cwt. as shown below for a shipment of 188 cwt. shipped from Mangalore to Bombay:–

		Rs.	As.	Ps.
Charity	...	18	14	3
Manifest writing	...	1	0	0
Dock fees	...	12	7	6
Freight	...	380	4	0
Marketing the bags	...	6	9	3
Stitching charges	...	22	4	3
Coir rope and tying	...	30	5	0
Labour charges	...	117	15	6
Boat hire	...	84	12	6
Weighment	...	2	5	9
Gunnies	...	305	15	6
Tarpaulin charges	...	1	5	0
Insurance	...	198	6	0
Hundi discount	...	39	12	0
Fumigation	...	35	6	3
Export fees	...	23	10	3
		1,281	4	9
Clerical charges etc.	...	34	11	3
Total for 188 cwt.	...	1,316	0	0

The commission for the shipper at Mangalore is paid at 1½ to 2% of the cost of supari which works out to about Rs. 3/- per cwt. at present. So, the total cost of marketing till the produce reaches Bombay per cwt. is :-

		Rs.	As.	Ps.
Drying the nuts	...	1	0	0
Husking	...	1	0	0
Transport	...	1	8	0
Seller's commission	...	3	8	0
Handling, freight etc. charges	...	7	0	0
Shipper's commission	...	3	0	0
Total	...	17	0	0

The quality of "Chali supari" of this district has to be kept up by the growers by strictly conforming to the complete drying of the nuts for 40 days, so that the market favour for Mangalore supari may be kept up. Due to the high prices of "Supari" during 1953-1954 season, even partially dry nuts were brought and sold in the Mangalore market but this if continued may affect the whole market for Mangalore "Supari." The scope for reducing the charges of marketing and thus increasing the return to grower has to be explored.

Pollachi as a centre for Marketing of Groundnuts

Groundnut as a commercial crop in the Coimbatore district is next in importance only to cotton. Out of the total groundnut area of 2,30,000 acres and a production of ten lakhs bags of kernels, of the district, the Pollachi taluk possesses a little less than half of the area and a crop of more than fifty per cent of the production. Pollachi being situated in a line with the gap of the western ghats has its own rainy season commencing in March-April and the cultivation season of the groundnut crop therefore commences during the months March-April and lasts till July-August, when it is harvested. The Pollachi production season therefore does not correspond either to the winter or to the summer seasons known as such, but is specifically known as the early winter season of Pollachi. Two important varieties are grown in this taluk. They are (1) Pollachi red, a bunch variety and (2) white, a spreading variety. Recently a white bunch variety known as 'College Kothu' is being tried, but the acreage under this variety is almost negligible. The famous red variety known as 'the Pollachi red' dominates the area occupying as it does four fifths of the total groundnut area of the taluk. The soil of this area is either red sandy loam or sandy loam and is best fitted for the cultivation of groundnut.

There are thirty-five oil mills in the taluk fitted with either rotaries or expellers and they have groundnut decorticators as an essential feature of the equipment. The quantity of groundnut kernels marketed in this area normally ranges from five lakhs to six lakhs of bags of kernels representing as pointed out above more than fifty per cent of the district production. Consumption by local mills is about a lakh of bags and exports to other districts amount to three lakhs of bags, while about two lakhs of bags are consumed by the oil crushing industry of the district outside the Pollachi taluk. The groundnut crop of this area happens to be marketed at that period of the year when it is not available at any other centre of India and consequently buyers from all parts of India are attracted to this market and the marketing activity proceeds actively and energetically within a short period of three months as the buyers are in the habit of covering their requirements rapidly without maintaining an establishment over a long period. Commercially the chief attraction is the red variety, the oil content of which exceeds that of any other known variety.

The Coimbatore taluk Committee's regulated market at Pollachi is located in the buildings known as 'the Rallis Godowns' situated on the Goodshed Road of the town. The place has decent godowns put up all round in a square fashion, with a drying floor in the centre. The comment of trade on the market premises is that it is insufficient for accomodating a crop so large as that of Pollachi, marketed rapidly within three months. The Committee deems it suitable for a start. This market was opened on 3—3—1954 With a view to attracting arrivals of the groundnut crop directly from growers to this market propaganda in an active form is being carried on.

Superintendent,
Coimbatore Market Committee,
Pollachi.

Regulated market in the Gobichettipalayam Taluk

The taluk of Gobichettipalayam is noted for cultivation of the commercial crops, like cotton, groundnut and tobacco, but is prominent as a production centre of tobacco of the best varieties popularly known as 'the Meenampalayam tobacco'. The cotton area of this taluk is 14,000 acres and a crop of one lakh of pothis (one pothi = 280 lb.) of Combodia kapas or approximately 10,000 candies (one candy = 784 lb) of lint is raised from the area. A groundnut crop of two and a half lakhs bags of pods (one bag = 80 lb.) is raised from an area of 25,000 acres. The tobacco area is 3,500 acres and the crop produced is about 10,500 cd. (one cdy. = 500 lb.) The cotton crop of this taluk stands to improve in size and quality in view of facilities proposed to be afforded by the Lower Bhavani Project.

Such hopes are not cherished regarding groundnut in this taluk which however may be expected to be steady on the basis of the existing acreage and yield. The trend of tobacco cultivation in this area is also not towards expansion under the cheerless conditions brought about by prices which hitherto were discouragingly low.

In an area which produces all the three leading commercial crops, the prime need of the growers is a regulated market for obtaining them fair prices for their produce. In shandies and in private premises the growers are practically helpless and sell in ignorance of the market rates and are for the most part losers. In their dire need for money distress sales are made by them at prices very much off the market rates and on other terms unfavourable to themselves. The zeal for cultivation receives a shock when the actual proceeds of sale are counted. Real succour to the cultivators at the stage of marketing can be imparted only by a regulated market.

Though after some delay, the Committee's regulated market has been opened at Gobichettipalayam. It is housed in the buildings and premises of Sri D. Sreenivasa Iyer situated on the Modachur Road. The Market was opened on 14—4—1954. The function was attended by a very large number of growers. Most of them participated in the function making enthusiastic speeches in welcoming the market. This market started working after the best part of the cotton season was over and nevertheless the record of sales effected shows about a thousand pothies of kapas marketed at rates ranging from Rs 135/- to Rs. 145/- per pothi which prices are considered encouraging. My experience of the attitude of the people in villages towards regulated markets is really heartening. If once, they know clearly what a regulated market stands for, they would not like to miss availing themselves of the facilities provided to them. In order to educate them on the subject propaganda by pamphlets is being carried on. It is also proposed to feature the market through slides of the cinema.

Market Yard Superintendent,
Coimbatore Market Committee,
Gobichettipalayam.

MARKET NOTES AND PRICES

SUPARI—MANGALORE

Market conditions of Supari (Arecanut) and Coconuts at Mangalore during January 1955 as reported by the South Kanara Market Committee.

1. The range of *market prices* for the month:—

For the week ending	Koka	Choll	Malabar supari	Mangalore supari	Copra per candy of 660 lbs.	Coconuts per 1000 nuts
	Rs.	Rs.	Rs. (per cwt.)	Rs.	Rs.	Rs.
6—1—1955	70 to 105	146 to 168	110 to 128	125 to 146	320 to 340	Raw-160 to 185 Dry -180 to 260
13—1—1955	65 to 115	150 to 174	do.	125 to 148	do.	R. do. D. do.
20—1—1955	do.	150 to 184	do.	do.	do.	do.
27—1—1955	do.	do.	115 to 128	do.	315 to 335	do.

2. The estimated *stocks* held and exports ("SUPARI"):—

Opening Balance Cwt.	Receipts Cwt.	Exports Cwt.	Closing Balance Cwt.
3,700	25,000	23,978	4,722

The price of "Supari" was firm during the month with a gradual increase in the price of "Choll" nuts. There was a sudden fall in price of copra towards the end of the month because of low prices in Cochin. Coconut prices continued to be steady and firm.

Mangalore,
5—2—1955.

Secretary,
South Kanara Market Committee.

The Weekly Average Prices of Commercial Crops in the Markets in South Arcot District for January 1955.

Markets of South Arcot Market Committee	Week Ending 7—1—'55 Arrivals in Tons	Week Ending 7—1—'55 Average Price per Candy		Week Ending 14—1—'55 Arrivals in Tons	Week Ending 14—1—'55 Average Price per Candy		Week Ending 21—1—'55 Arrivals in Tons	Week Ending 21—1—'55 Average Price per Canddy		Week Ending 28—1—'55 Arrival in Tons	Week Ending 28—1—'55 Average Price per Candy		For January 1955 Arrivals in Tons	For January 1955 Average Price per Candy	
Groundnuts Kernels		Rs.	A.		Rs.	A.		Rs.	A.		Rs.	A.		Rs.	A.
Vridhachalam ..	589	90	0	303	95	13	263	92	13	457	93	2	1722	95	2
Villupuram ..	342	95	12	169	89	12	97	89	8	173	86	4	845	90	5
Tindivanam ..	728	96	12	336	94	6	283	93	12	524	90	14	2710	89	12
Tirukoilur ..	314	94	11	202	94	12	168	92	5	190	87	12	930	90	4
Cuddalore OT ..	72	95	12	52	88	15	31	91	10	13	90	6	181	91	11
Panruti ..	75	90	11	43	87	12	26	81	15	59	85	0	211	86	6
Chinnasalem ..	66	91	6	28	93	4	32	87	6	28	84	8	159	89	0
Ulundurpet ..	73	90	2	57	86	0	30	89	8	61	82	4	237	85	0
Gingelly Price per Bag of Two Imperial Maunds.															
Vridhachalam ..	84	39	5	83	39	12	88	37	6	60	37	8	330	37	11
Cotton Price per Pothi of Two Hundred and Eighty lbs. Kapas.															
Villupuram ..	1	82	0	..			..			..			1	82	0

N. B. Bag—177 lbs. kernels net; Candy—531 lbs. kernels net; Ton—12·6 Bags kernels.

Notes on Crop Condition, weather etc.,

Harvest of winter groundnut crop concluded. Sowings of summer crop commenced in parts. Arrivals declined due to a fall in prices of kernels consequent on declining prices of oil. Arrivals of gingelly and cotton to Vridhachalam and Villupuram markets respectively were poor.

Cuddalore,
11—2—1955.

Secretary,
South Arcot Market Committee.

Market Conditions of Cotton at Kovilpatti during January, 1955 as Reported by the Tirunelveli Market Committee, Kovilpatti.

1. The range of market prices for the month.

For the week ending	LINT (Candy of 784 lb.)				KAPAS (Pothi of 280 lb.)				COTTON SEEDS (Pothi of 280 lb.)			
	Karunganni		Uganda		Karunganni		Uganda		Karuganni		Uganda	
	1st Quality	2nd Quality	1st Quality	2nd Quality	1st Quality	2nd Quality	1st Quality	2nd Quality	1st Quality	2nd Quality	1st Quality	2nd Quality
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
6—1—1955	730 to 760	620 to 730	1,160 to 1,240	975 to 1,060		No Stock			27	25 to 26	22—8—0 to 26	17 to 19—8—0
13—1—1955	730 to 750	700 to 720	1,190 to 1,210	1,100 to 1,120		No Stock			26—8—0	25-12—0	24	22
20—1—1955	740 to 750	700 to 730	1,200 to 1,220	1,000 to 1,020		No Stock			24	22-12—0	25	20—8—0
27—1—1955	690 to 700	650 to 690	1,190 to 1,200	1,100 to 1,120		No Stock			25	22-12—0	24	22-12—0

2. The cotton market was generally steady for most part of the month but turned out to be weak towards close. Forward contracts to the tune of about 500 candies were entered on behalf of mills at prices varying from Rs. 690 to 695 per candy. The trend appears to be weak and prices are likely to be lower than that of the last season.

Koilpatti,
10—2—1955.

Secretary,
Tirunelveli Market Committee.

OBITUARY

T. V. RANGASWAMY

We deeply regret to record the untimely demise of Sri T. V. Rangaswamy, Assistant Cotton Specialist, at the early age of 47, after a brief illness at his native place, Tiruvarur. Born on 26th January, 1908, he joined the Madras Agricultural Department as Assistant in Cotton in 1929 after graduating from the Agricultural College, Coimbatore.

He was reputed to be one of the hard working, sincere and outstanding workers in the Department. He used to reveal an astounding intimacy with cotton breeding material and was very intimately connected with the breeding of long staple American cotton in Madras, particularly with the evolution of strains Madras Cambodia Uganda - 1 and Madras Cambodia Uganda - 2.

He was promoted to the Gazetted cadre as Assistant Cotton Specialist in March, 1947.

He was suffering from cardiac trouble for the last one year, but his end was sudden and unexpected. He leaves behind his wife, four sons and a host of relatives and friends to bemoan his loss.

May his soul rest in peace.

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Editorial

"What is your big idea?" is the question asked of the rank and file by the management of many a firm in the United States. Many useful suggestions for the improvement of the firm are thus culled out from the workers, resulting in enormous gains to the firm concerned. It is said that in a year 4,000 U. S. firms make a direct profit of 300 million dollars from the utilisation of the suggestions received from the employees. Today, this mode of tapping the lower rungs for ideas is well established and organised to a high degree in the States under the National Association Suggestions Scheme (NASS) and the suggestion system has come to stay in almost all enterprises of the United States. For, it is not always the top ranking men in any concern, be it Government or Private, that get the brain wave for the right thing. It is very often the smaller underlings that get the bell ringing in their brains for some top notch ideas and tapping this huge reservoir of creative ideas will always benefit not only the concern but also the country at large.

In India, except for a few concerns like the Ordinance Factories, the rank and file are never called upon to give ideas. Consequently, there is lack of interest and enthusiasm among the lower ranks. What is true of Industry is a hundred fold true in Agriculture. Many a Reform and Research Scheme is mooted at top levels without any suggestions being called for, from the actual tillers of the soil and the workers in the field. To draw out good constructive ideas from the lowest worker in the line, it is necessary to have the suggestion system well publicized and the worker made to understand that his ideas will get serious and impartial consideration. It is not, however, sufficient to

merely hang out a notice calling for suggestions, as this would not enthuse the worker to freely donate his big ideas. It is necessary to give an incentive by way of reward for really worthwhile ideas emanating from the lower ranks of workers. We have many Research Schemes, Extension Projects and Reforms planned out at higher levels and put to execution. If these committments are chalked out after getting the suggestions and ideas from the rank and file of the workers in the particular field, the many short comings and later pitfalls could be avoided and the one Governmental objective, viz., *efficiency*, could be easily achieved. But, as pointed out already, worthwhile ideas will not be forthcoming unless the rank and file are assured of recognition with some award for the big ideas coming from them. These big ideas, as pointed by Virgil Moore of the Cynamide, are very often the simple and obvious, which the top ranks would have missed in their preoccupation with their multifarious duties.

Reorganisation of Agricultural Education in India

by

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Indian Dairy Research Institute, Bangalore

About 90 percent of the population of India is concentrated in the villages. Of this, over 80 percent is dependent on agriculture for its livelihood. So, about 75 percent of the total population of India is directly or indirectly living on agricultural operations. Besides, agriculture is the largest industry of the country and quite many of the other industries are dependent on agriculture. In spite of this paramount position agriculture occupies in the national economy of the country, little attention was paid to this industry till recently. During the days of foreign rule, agriculture was looked upon as a source of raw materials for the industries of the ruling country. That is how India had to be importing food even in normal times, inspite of its immense agricultural potential. Only after the beginning of the last war, when rice was not available in the exporting countries, attention was focussed on producing enough food within the country itself. Even after the war, world-food-shortage continued and internal supplies became more and more inadequate in India due to the continued increase in population, loss of agricultural land as a result of the partition of the country and the failure of monsoon during successive years. Even now, one cannot say that agriculture is given the place it deserves in our national life. However, it is gratifying to note that more and more people have come to realise the importance of agriculture to national well-being.

Much is being talked about the reorganisation of agriculture to enable the production of the entire food supplies needed in the country, within the country itself. The illiteracy and the ignorance of the ryots are the chief bottlenecks in increased agricultural production. The improved methods of production developed in our Research Institutions and taught in our agricultural colleges do not reach the actual tillers of the land who alone can put them into practice and effect any improvement in production. With this end in view various proposals are being made at different levels. Extension programmes, and community development programmes are being inaugurated in different centres of the country to improve the condition of the agriculturist. The improvement must be made at the lowest possible level—and this is possible only by reorganising agricultural education and popularising it in such a way that improved methods of agricultural practices will reach the doors of every farmer in India. With this object in view suggestions are made in this paper to reorganise the agricultural education to fit in with the needs of the country at the present moment.

Agriculture and animal husbandry are very much dependent on each other in India, so much so, one cannot be separated from the other. But this is not at all recognised by many people. Consequently agricultural colleges specialise in agriculture almost completely ignoring animal husbandry. The veterinary colleges which exist today impart instruction in the curative and preventive aspects of animal husbandry. The animal population of India is mainly composed of cows and buffaloes and hence dairy husbandry must be the centre theme of any training in animal husbandry. It is well known how much the welfare of our cows and buffaloes are dependent on agriculture and vice-versa. Therefore it is clear that land, agriculture, animal husbandry and dairy science cannot be separated from each other—one is complimentary to the other. Hence the need for any agricultural education to be well balanced in agriculture, animal husbandry and dairying. Any specialisation in one particular branch should be done after the degree stage only.

Just now, we have but few Agricultural Colleges giving instruction up to the degree standard. The minimum standard of admission is inter-seience and the period of training is, three or four years, so much so, it takes nearly six years after matriculation for the training in agriculture. This is beyond the reach of the average agriculturist and hence the course has to be simplified if it is to become popular among the agricultural population. Institution of a diploma course of two years duration in agriculture and animal husbandry and dairying will be the only solution to meet the situation. These agricultural schools will be situated not in towns but in the rural areas. To start with, one school may be opened in each district. Lower secondry (either pass or failed) will be the minimum qualification for admission and the training will be in the local vernacular and concentrate equally on the practical aspects of agriculture, animal husbandary and dairying. Only children of agriculturists will be admitted to this course, so much so, they will be almost familiar with the current agricultural practices in the area. So, the training will concentrate on the improved methods of production in the three fields. No fees will be levied, but at the same time, production from the farms attached to each school will meet a portion of the cost of the training. After the two years of training, the diplomas will be awarded based more on the progress-report of each student than on any formal examination. These diploma holders will then mostly return to their farms in the villages. Some of them will be available for teaching agricultural subjects in all primary schools as per the basic education system or for extension work on the country side envisaged in the community projects. Even some of the lower jobs of the agricultural and animal husbandry departments will be open to them. In any case, these diploma holders are to form the back bone of all agricultural extension work in the country and without such an army of

trained workers in the agricultural and animal husbandry fields, it is not possible to improve the standard of agricultural production in the country.

A second stage in the reorganised scheme of agricultural education will be a degree course in agriculture laying equal emphasis on the theory and practice of agriculture, animal husbandry and dairying. Here, the minimum educational qualification for admission will be a pass in intermediate with Chemistry, Botany and Zoology. This course will extend to four years, and the degree will be awarded after a course of approved practical training. These colleges will also be situated in rural areas to give an actual agricultural bias to the training and also extensive farms will be available for practical training. Even here, the admission will be open to students with some aptitude for agriculture. These agricultural graduates will be required to fill the supervisory and lower gazetted posts of the agricultural departments.

A third stage in agricultural education will be the specialisation in any of the branches of agriculture, namely agricultural production, animal husbandry and dairying, after a four year degree course. Only one such post-graduate college will be needed in each province, where regular instruction will be given in the three different brances for two years. Simultaneously, each student will have to work on a problem and submit a thesis as part of his examination. On passing the examination, these post-graduate workers will be awarded M. Sc. (Agri.) degrees. These M. Sc., graduates will be experts in their own branches of specialisation and will be required to fill the superior posts of Agriculture department particularly research and teaching posts.

To put through this scheme of Agricultural education, it will be necessary to reorganise the agricultural department itself. Both the agricultural and animal husbandry departments will be combined under one Director of Agriculture with three joint Directors, each in charge of Agriculture Ani. Husbandry and Dairying. The reorganisation scheme of Agricultural education also will be placed in charge of the Director of Agriculture, so that all facilities for practical training will be available to the students. Of course the examinations at the 2nd and 3rd stages will be conducted under the supervision of the Universities.

The reorganisation of Agricultural education on the above lines will provide the necessary facilities for an agricultural extension service. In the reorganisation scheme to begin, with, each district is to have an agricultural school with a farm attached. The farm will have all the three sections, agricultural production, animal husbandry and dairying. Side by side with the diploma course, short extension courses of 3 months' duration compraising all the three sections, or one month course in any section will be arranged for the benefit of the village farmers. During

the annual holidays of the school, refresher courses could be conducted for the benefit of agricultural extension workers, with a view to give them opportunities to be in touch with the latest developments. Even other arts and science college staff-members and students can undergo this summer extension course. Besides all these activities in the school itself, there should be a regular set up of people attached to the school, and equipped with all the necessary propaganda material to go into the villages and explain the latest advancements in a popular language.

Recent Advances in Agriculture — their Importance to Coconut Industry

by

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Introduction: Considerable research work is being pursued on the theoretical and practical aspects of agriculture in the different countries of the world and results of practical importance are getting accumulated from year to year. Only careful study of individual problems can however reveal to what extent the results would be of practical applicability for the improvement of the crop concerned.

Systematic long-range applied research on coconut is of recent origin. Copeland has, in his well-known book, described the work done in the Philippines on the physiology of coconut in the earlier years. The four coconut Research Stations in the Madras State have contributed much valuable information on the development of the crop. A research Scheme on coconut was initiated in Ceylon in 1933. In 1929 the Department of Agriculture, Straits settlements and Federated Malaya States started research on Coconut products. Entomological work in Fiji has provided good examples of biological control. Research Stations in Indonesia carried out much work on coconut palms.

There is shortage of oils and fats in our country due to industrial advancement. It has been accepted that the main source of expansion in world fat supplies lies in extended development of the scientific cultivation of appropriate oilbearing plants. Coconut is one of the major oilseed crops of India. Hence the extension of research and the wide application of present knowledge to existing coconut lands would result in increased production of coconuts.

1. **Breeding:** In the principal coconut growing countries seednuts are selected from high-yielding mother palms that have other desirable economic characters. Because the male parent is unknown, and because the female parent is itself heterozygous, there is no guarantee that the performance of a high-yielding palm will be reproduced in its progeny. Selected palms should therefore be subjected to extensive progeny tests and subsequently crosses between proved parent trees should be planted, establishing a garden with pedigree trees. The value of this work is two fold. When the palms are established, the day to day requirements of planting materials of more superior geno-type than are supplied now can be released and simultaneously by a process of modified mass selection, a superior strain of coconut is evolved. With this end in view progenies of selected mother palms have been planted both in the Coconut Research Stations in the State and ryots' holdings to observe their plantation performance. In the meanwhile one can only recommend the use of seednuts from selected high yielding mother palms with other desirable characters; such nuts having at least a somewhat greater chance of giving superior progency. It is on this basis that a large scale production of selected coconut seedlings has been undertaken at the Government Cocouut Nurseries for meeting the large requirements of the growers in the State.

In the Coconut, two distinct varieties are met with viz., the Tall and the Dwarf. The Tall variety is a very desirable multipurpose palm yielding nuts, copra, oil and fibre of good quality, but it comes to bearing in about 7 to 8 years after planting. The Dwarf variety on the other hand, begins to yield early (i. e. 3 to 4 years after planting) but its nuts are small and the copra is of inferior quality. In order to synthesise new forms combining the desirable features of both the varieties, inter-varietal hybridisation had been carried out at the Coconut Research Stations in the State and a study of the progeny has shown that the hybrids of certain select parents are very vigorous and early bearers yielding nuts and copra of good quality. The production of such hybrid seedlings from select parents, though done on a small scale, is a regular feature of the Coconut Research Stations in this State at present. Besides the Tall variety of the west coast there are desirable exotic varieties like Andaman ordinary, Laccadive ordinary, Cochin China etc., which also possess economic characters and these are also being used for evolving new forms.

2. **Nursery:** An investigation under the coconut Research Scheme in Ceylon showed that there is little difference in weight, whether of total or of dry matter between a 7 months old seedling ready for transplantation and the original seednut. The carbon compounds in the food reserves of the seed are adequate up to the transplantation stage; the plant is also self-supporting in Nitrogen. By the time the roots of the seedling pierce the husk and reach the soil much of the potash salts get leached out if

there had been heavy rains and the residual potash would be inadequate. It was observed that application of potash fertilizers to nurseries at a convenient stage had a marked effect on seedlings growth.

Coconut nurseries are not generally manured as it is believed that the intrinsic qualities of the seedlings would be masked by extra nutrition due to manuring. However, nurseries raised in West-Coast where the rainfall is heavy need application of potash fertilisers to make available adequate quantity of potash for the satisfactory growth of the seedlings.

3. **Intercultivation:** Regular intercultivation (i. e. ploughing or digging with mammutty) is very necessary for coconut gardens as it has been proved at the Coconut Researah station in Madras that it improves the yield of the trees to a remarkable extent. Conservation of soil moisture in the coconut soil is an important problem facing the coconut growers. Long periods of drought have been observed to affect the yield of coconut considerably. Studies made at the Central Coconut Research Station, Kasaragod have shown that the moisture content of the soil was more at all depths in the manured and intercultivated plot when compared to that of the "No manure, No cultivation" plot. It was also observed that the soil moisture went down to very low levels in the littoral sandy soil as the summer progressed. It is, therefore, very necessary to intercultivate the coconut gardens properly and regularly for increased production of coconuts. Recent experiments at the Coconut Research Station, Nileshwar have shown that by growing *Calapogonium mucunoides* as a green manure cum cover-crop in the coconut gardens the soil moisture is greatly conserved and the trees do not suffer much during the hot-weather period.

4. **Manuring:** Unlike in annual crops and other perennial trees the effect of manuring on the yield of the coconut is noticed only after a period of 2½ to 3 years since this period is required for the development of the nuts, from the primordial stage to full maturity. Therefore ordinary chemical methods to determine the requirements and choice of nutrients for application would take much time to yield results of practical utility. The technique of using Radio-active isotopes to study translocation of nutrients and the extent to which they are taken up and utilised by plants offers great scope for rapid estimation of the requirements of the coconut palm growing under varied conditions of climate and soil. Further the new method of spraying nutrients and micro-elements to induce better growth and correct deficiencies has opened a new field of investigation with regard to coconut. To study this aspect of nutrition, work on coconut has been taken up at the Central Coconut Research Station, Kayankulam. It was found that the thick cuticle nature of the coconut leaves does not help the full absorption of the nutrient sprayed and hence only softer and younger leaves will have to be treated in the

investigations. Better and quicker indications of the response to the treatments are expected by spraying the micro-nutrients on young seedlings.

Manurial experiments carried out in Ceylon have shown that Potash is a dominant requirement of the coconut palm. The husks and nut water from plots receiving potash show a content of this element significantly higher than those from plots receiving none. From the possibility of its use as a diagnostic, the nut-water potash has received particular attention. In the study of Potash accumalation in husk and nut-water carried out in Ceylon this method of potassiam estimation was adopted and it was found that the potash content of the nut-water increased linearly with the doses of potash applied. In recent times, tissue-test method has proved useful in the diagnosis of mineral element deficiencies in a variety of crop plants. At the Central Coconut Research Station, Kayangkulam this method was tried in the case of coconut and it has been found very helpful in the estimation of major plant food ingredients and micro-nutrients contents in the leaves.

5. **Pests and Diseases:** (a) *Pests:* The most serious pests of the coconut palm are the Rhinocerous beetle, Red-palm weevil and Black-headed caterpillar. Though some effective methods of combating these pests have been recommended the unwieldy height of the trees and the large size of the plantations to be dealt with stand in the way of the control measures being adopted on an extensive scale by the coconut growers. Therefore quick-acting and practicable control methods would satisfy the growers to a great extent. The injection of Pyrocone E (1 per cent strength) into the crowns of infected palms by the gravitational method of Roach has been found very effective for the control of the Red-palm weevil pest. This method of control on account of its simple nature and deadly effect is becomming very popular among the coconut growers.

(b) *Diseases:* Among the diseases affecting the coconut palm the serious ones are Bud-rot, Stem-bleeding and Root-rot. Though the popular fungicide Bordeaux mixture has been found effective in the treatment of the major diseases of the coconut it is recommended for administration more as a prophylactive measure.

The new approach to plant disease control through internal immunisation and chemical cure has found success in the treatment of plants affected with vascular diseases causing wilts and bleeding and virus diseases. The possibility of curing, the 'Root diseases' and the Leaf-rot disease of coconut by injecting chemicals has been explored at the Central Coconut Research Station, Kayankulam. Injection through cut ends of matured roots has been found very effective in coconut palms. Hence the chemical control methods offer great promise in the treatment of diseases like the Bud-rot, stem-bleeding and Root-rot of coconut.

Scientific advancement is quite essential for national progress. For an agricultural country like India it is much more necessary. The recent advances in scientific work stated above hold promise of giving rise to practical developments which would be of great interest to those engaged in coconut growing and the coconut industry in general.

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Studies on '*Anthracnose*' of French Beans

by

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Introduction: *Colletotrichum lindemuthianum* (Sacc. and Magn.) Bri. and Cav., which is responsible for the disease known as 'anthracnose' affecting french bean (*Phaseolus vulgaris.* L.), Scarlet runner bean (P. *multiflorus* L.) Cowpea (*Vignacatjang.* L.) and *Dolichos lablab* L.) enjoys wide distribution almost in all countries. But whether the disease on these hosts is due to the same fungus or to different races of it, or to distinct but related species has not been definitely established (Butler and Jones, 1949).

In this state 'anthracnose' of french bean is prevalent on the Nilgiris and the Palnis.

In India 'anthracnose' of *D. lablab* has been reported by Butler (1917). Subramaniam (1953) has described the same from Coimbatore and has identified the pathogen as *Colletotrichum lindemuthianum* (*Glomerella lindemuthianum*).

In order to determine whether the pathogens causing the two diseases in this State belong to the same species, investigations were undertaken and the results of these studies are presented in this paper.

Materials and Methods: The fungi were brought into pure culture from fresh specimens of infected host material obtained from the Nilgiris and Coimbatore respectively by the single spore isolation method. The agar media employed in the studies were prepared according to Riker and Riker (1936). The plants for inoculation studies were raised from selected, healthy seeds. Pods used for inoculation were surface sterilised and kept inside sterilised moist chamber. Inoculations on host plants were carried out by spraying spore suspension or by placing bits of culture on them. The inoculated plants were covered with alkathene bags or with bell jars to maintain high humidity. The isolate from french bean was maintained in the refrigerator at 60°F.

Experimental Results: The spores of the fungus from *Dolichos lablab* exhibited abundant germination even at the laboratory temperature in distilled water but the spores of the fungus from french bean (*P. vulgaris*) did not germinate in distilled water at laboratory temperature (82°F to 85°F). The germination of the spores from french bean was tried in various media under different temperature conditions and satisfactory germination was obtained only in french bean agar at 60°F. Even at this temperature it took 72 to 76 hours for the germ tubes to develop. The spores from *D. lablab*, germinated freely within three hours at laboratory temperature.

As a result of these studies it was found that for maintaining the culture of the french bean isolate, the culture plates and the culture tubes had to be kept inside the refrigerator at 60°F., while the cultures of the other isolate could be maintained at the laboratory temperature (82°—85°F). The former isolate made satisfactory growth only on french bean agar and not on oats or Richards' agar, while the isolate from *D lablab* grew well on all these media. A comparative estimate of the growth and sporulation of the two isolates on french bean agar at 60°F and 82°F was made and the results are given below.

TABLE I.

Isolate	Diameter of growth in 9 days (m. m.)		Sporulation	
	60° F	82° F	60° F	82° F
Frenchbean isolate ..	31	10	Numerous acervuli present	Growth negligible
Dolichos lablab isolate ..	21	71	Sporulation scanty, visible after a week, Growth poor.	Numerous pink acervuli, sporulation commenced in 3 days.

It is evident from the data that the french bean isolate thrives under low temperature while the *D. lablab* isolate requires higher temperature for satisfactory growth and sporulation. This is in keeping with the natural distribution of the two isolates.

Pathogenicity: To determine the relative pathogenicity of the of the two isolates inoculations were carried out on the stem of *D. lablab* Horsegram *(D biflorus)*, Cowpea *(V. catjang)* and pods of french bean *(P. vulgaris)*, *D. lablab* and cowpea. The inoculations were carried out in two series, one at the atmospheric temperature under green house condition while the other was made on hosts kept at 60°F. in the refrigerator. It was found that the french bean isolate infected only the pod of french bean in the series kept at 60°F. Positive infection was not obtained even on french bean pods kept at green house temperature. The isolate from *D. lablab* infected only the stem and pods of *D. lablab* in the series kept in the green house. There was no infection at 60°F.

Measurements of Conidia: The spores of the two isolates obtained from fresh host material were measured to find out whether any differences existed between them. No difference could be observed either in the shape of the spores or in their size and they exhibited similarity in spore characters. The following measurements were obtained:

French bean isolate — $16 \times 6\mu$ (12 to 25×3 to 6μ).

Dolichos lablab isolate — $17 \times 6\mu$ (12 to 22×3 to 6μ).

Discussion: The studies have shown that though there are no morphological differences between the isolates, considerable differences are exhibited in their pathogenicity and cultural characters. The isolates are found capable of infecting their own hosts only and appeared to be highly specialised in their parasitism. Many races are known to exist in *Colletotrichum lindemuthianum* exhibiting differences in their capacity to infect different varieties of french bean (Butler and Jones, 1949). The optimum and maximum for growth lie between 22 to 23°C. and 30 to 31°C. respectively, but records exist were the maximum is stated to be 33 to 35°C. Here again it is evident that different races exhibit differences in their temperature relations. The differences exhibited by the two isolates understudy go to show that there exist in this species low temperature races and high temperature races each being confined to certain climatic conditions. Ramsay and Wiant (1941) state that humidities of about 95% at temperatures between 64°F. and 65°F. are favourable for germination of the spores and penetration on hosts by *C. lindemuthianum* This is more or less in agreement with the results obtained with the french bean isolate. The other isolate is obviously favoured by higher temperature for germination, growth and infection.

It is considered that though there are differences in the pathogenicity and cultural characters they are found to be morphologically alike and therefore belong to the same species.

Summary: The fungus *C. lindemuthianam* isolated from french beans is observed to be a different strain from that affecting *D. lablab.* The french bean isolate failed to infect *D. lablab*, Cowpea and Horsegram and requires an optimum temperature of 15°C. for its development and infection.

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Grapevine Diseases and their Control

by

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Grapevine is cultivated in a number of districts in this state. Madura leads in the acreage and the vines are grown in a number of taluks of this district. Outside Madura district, grapevine cultivation is prevalent to a limited extent in Tirunelvely, Tiruchirapally, Coimbatore, Salem and S. Arcot districts. The total acreage in this state may not exceed 500 acres. The variety commonly cultivated is known as "*Pachai dhrakshi*" in Tamil. Some growers however have introduced the seedless Australian varieties. 'Blackprince' and another purple fruited variety are also grown to some extent. This crop is highly remunerative but needs careful attention in pruning and in the control of the diseases which form the limiting factors in the successful production of the fruits. The chief diseases affecting the crop and the methods of controlling them are described in the following pages.

Downy mildew: This disease is caused by the fungus *Plasmopara viticola* (Berk. & Curt.) Berl. & de Toni, which is an obligate parasite. It has been recorded from all countries where grapevine is cultivated and is one of the most serious diseases attacking this crop. In this state also it has been noticed in all the districts where the vine is grown. It occurs during the rainy season and when there is heavy fall of dew. During the summer months however it is not prevalent. Under favourable weather conditions it spreads very rapidly and may destroy the entire crop in a short period.

The fungus infects the leaves causing yellowish irregular spots on the upper surface. On the corresponding lower surface a white downy growth made up of the conidiophores and conidia of the fungus develops. The fungus mycelium itself is internal and spreads inside the affected tissue. The name of the disease is derived from the appearance of the growth of the fungus on the surface. The conidia are disseminated easily by wind. The large number of conidia produced by this fungus is responsible for the rapid spread of this disease. These conidia germinate under humid conditions and cause fresh infection. Many of the leaves become infected and the disease spreads to the young shoots causing their eventual drying up. The affected portions of the leaves turn brown and defoliation occurs. In one week the disease may spread throughout the garden. Besides affecting the leaves and stem, young inflorescences and fruit bunches are also invaded resulting in their shrivelling and drying. When half ripe fruits are infected they shrivel up completely and all the berries in the bunch turn brown and leathery. Considerable loss of the crop is caused and in some seasons the entire crop may be destroyed. (Plate I, Figs. 1, 2, 3).

The oospores (perfect state) of this fungus have not been observed in this state. The survival of the disease from season to season is brought about by the persistence of the fungus in the vines, which are left unpruned or which are pruned at varying periods. Even in the vines which are pruned at the same time, the fungus persists as dormant mycelium in the buds or the shoots.

Control: The control of this disease depends on the strict observance of plant sanitation methods and protection of the vulnerable parts of the vines at critical periods. For this purpose a regular schedule of operations has to be followed. Some growers leave the vines which are infected without pruning while other vines nearby are pruned. Other growers stagger their pruning operations so that the vines in all stages of growth are found in the same garden. These are conducive to the continuance of the disease as the unpruned vines will form a ready source of infection to the new shoots that grow out of the pruned ones.

As soon as the vines are pruned it is advisable to wash the stem and branches with one per cent Bordeaux mixture so that the pathogen on the surface may be destroyed. All the prunings are to be destroyed and should not be allowed to remain in the garden. The new shoots that grow out will need protection and this can be achieved by spraying them with the same fungicide about 3 to 4 weeks after pruning. The young shoots may be adversely affected in some varieties by the use of one per-cent Bordeaux mixture. In such cases it is desirable that the strength of the mixture is reduced to 3 : 3 : 50 A third spraying will be necessary before the opening of the flower buds. After the fruit set, the young bunches are again to be protected by spraying one per cent Bordeaux mixture. Depending upon the weather conditions one or more further sprayings may be necessary to protect the growing bunches. At Pattiveerampatty, in some seasons the vines have received as many as eighteen sprayings during one season. During the course of the trials conducted at Ganguvarpatty it was found that 'Cupravit ob 21' at the rate of 1 lb in 25 gallons of water was also effective in controlling this disease. There is no need to add adhesives like soda and resin or casein to the fungicides as the rainfall in these areas is not heavy enough to wash away the fungicides. During the trials no adhesives were added to either Bordeaux mixture or Cupravit and the disease was completely kept in check. The addition of resin and soda as adhesive as practised by some of the growers in Madura district actually resulted in the infestation of the bunches by mealy bugs. It has been reported that vines which are not adequately supplied with nitrogenous manures are more readily affected by the downy mildew and therefore it appears that application of adequate quantities of nitrogenous manures in the begining of the season will be useful in invigorating the vines and reducing the damage caused by this disease.

Powdery Mildew: This disease is also widespread being prevalent all over the world. It is caused by the fungus *Uncinula necctor* (Schw.) Burr. This fungus produces a powdery white growth on both sides of the leaves and on young shoots. This is made up of the mycelium and the conidia of the fungus. The growth is external but haustoria are sent into the epidermal cells to obtain nourishment. As a result of infection, the leaves may turn pale and sometimes they curl up and are shed. Infection of the flowers results in their destruction and prevention of fruit set. The fungus infects the berries also enveloping them with a white powdery coating and causing them to crack and fall before they mature. Under humid conditions the cracked fruits are easily invaded by other saprophytic fungi which help in the destruction of these berries. Dark specks may develop on the rind of the berries at the infection spots when the disease is mild. This disease occurs more during the drier months when warm sultry conditions prevail and the sky is overcast. In some years it causes heavy damage. In America and Europe the fungus causing the disease has been known to produce the imperfect (conidial) state and the perfect (perithecial) state. The perithecia contain asci and ascospores and appear as dark brown dots in the mildew growth. They help in the survival of the fungus from year to year. But in this state the perfect state has not been observed so far. The fungus survives as dormant mycelium on the shoots or in the buds from one season to another. (Plate I, Figs. 4, 5).

Control: Powdery mildew is easily controlled by dusting finely powdered sulphur on the leaves and fruits. Since the disease is prevalent only during the drier season, dusting of sulphur will be necessary for the fruits developing during this period. Though Bordeaux mixture spray will be efficient in controlling the mildew on the leaves it has been the experience that for the protection of the bunches against this disease, sulphur is more effective. Further this fungicide controls also thrips damage to the fruits. Vines must not be over crowded and thinning of leaves may be helpful in improving ventilation and thus avoiding conditions favourable for the spread of the disease.

Anthracnose: This disease is prevalent in Madura and Salem districts especially on the 'Pachai drakshi'. It is caused by the fungus *Elsinoe ampelina* Shear. The imperfect state of the fungus (*Sphaceloma ampelinum* de Bary—*Gloeosporium ampelophagum* (Pass.) Sacc. has been observed in this state. Depressed cankers are formed on the stem and twigs. The growth of the young infected twigs becomes arrested and they remain short, eventually drying up. Brown spots with dark coloured margin develop on the leaves. Severe damage is caused to the berries on which circular brown sunken spots with dark brown margin develop. Based on the appearance of the spots on the berries the disease is commonly known as 'bird's eye disease'. One or more spots

may form on each berry. The berries later shrivel and dry up. Entire vineyards may be damaged The fructifications of the imperfect state of the fungus appear on the spots as minute raised dots. (Plate II, Figs. 3, 4, 5).

The pathogen survives in the cankers on the stem and causes fresh infection of the new shoots and berries. The damage caused by the disease is very severe in Krishnagiri where the growers do not usually adopt any control measures. Grapevine cultivation in this tract is dwindling on this account.

Control: It is very difficult to keep this disease in check unless the methods of control are adopted in a systematic manner. It has been stated earlier that the fungus survives in the cankers on the stem. All diseased twigs are to be removed. Some old cankers on the main stems may escape detection and may serve as sources of infection. These should be inactivated. For this purpose when the vines are pruned, the stem should be painted with a solution of ferrous sulphate in commercial sulphuric acid (5 pounds of ferrous sulphate, half pint of sulphuric acid in one gallon of water). This should be carefully handled The prunings should be burnt or buried deep in the soil so that the fungal spores from these may not infect the new shoots. Further, the new shoots and the young bunches should be protected by repeated sprayings of one percent Bordeaux mixture at intervals of 2 to 3 weeks depending on the weather conditions.

Black rot: This disease has been observed in recent years in Madura district. It is severe on certain purple varieties and is less common on the seedless Australian or 'Pachai drakshai' varieties. It is caused by the fungus *Guignardia bidwellii* (Ell.) Viala & Rav. In Madura district, the infection is more on the berries. The symptoms appear usually when the berries are half mature Circular spots develop on the berries and minute black dot-like pycnidia are formed in these areas. With great rapidity the disease spreads. The berries shrink in size and get darkened. Whole bunches become readily affected. (Plate II, Fig. 1, 2).

Control: This disease is prevalent in most of vine growing countries of the world. It was not recorded from this State till now and therefore must be considered to have been recently introduced into the country. Since the damage occurs on the maturing bunches it is necessary that these should be protected against infection from the time of fruit set. Bordeaux mixture has been found to be very efficient in controlling this disease. One or more sprayings on the young bunches will prevent infection. But this fungicide may leave deposits on the berries when sprayed on maturing bunches and thus reduce their

commercial value. Other copper fungicides like 'Cupravit ob 21' may be used with good effect. These do not leave any visible deposit and can always be used for spraying the bunches.

Rust: Rust of vine caused by *Phakopsora vitis* Syd. has been recorded only from Salem, Nilgiris and Coimbatore districts. It is usually confined to the variety 'Black prince'. Besides infecting the cultivated vines the same fungus has been observed on some of the wild relatives like *Vitis* sp. *Ampelocissus arnottiana* Planch and *Cissus* sp.

The fungus produces numerous orange coloured sori on the lower surface of the leaves. In severe cases of infection the entire leaf surface is covered by the sori. Defoliation also takes place. The uredial state alone has been observed in this state. The disease is common during the colder months of the year (November to February).

Control: Repeated dustings with finely powdered sulphur have resulted in keeping the disease under check. Since the rust is confined to one variety only it will be necessary to adopt this treatment to that variety alone.

Brown Leaf Spot: This is a minor disease caused by *Cercospora viticola* (Ces.) Sacc. and is prevalent usually in neglected vineyards during the months of July to December. Dark brown angular spots are formed on the leaves and young shoots. The clusters of conidiophores and conidia appear as black dots on the spots. In some instances the young shoots dry up as a result of the infection. High humidity favours the spread of the disease. The perfect stage of the pathogen has been observed in America and is named as *Mycosphaerella personata* Higgins. This has not however been recorded in this state.

Control: Proper manuring will result in the vigorous growth of the vines and such vines are not usually infected. The protective spraying with copper fungicides recommended for the control of the other diseases will prevent this disease also. As a matter of fact the disease has not been observed in vineyards receiving the normal spray schedule.

General: It has been the experience in this state that one or more of the above mentioned diseases affect the vines at the same time and therefore a comprehensive method of treatment will have to be adopted in controlling them all. Based on the results obtained in the different districts the following schedule has been drawn up for adoption in the areas where anthracnose and mildews are prevalent at the same time.

1. *On pruning*: Swab the steam with the solution of ferrous sulphate in sulphuric acid. This need not be done in areas where anthracnose is not prevalent but may be substituted by Bordeaux mixture

wash. The cut ends of the vines are to be protected by painting with Bordeaux paste.

2. *Two to three weeks later*: Spray 3: 3: 50 Bordeaux mixture or Cupravit ob 21. Complete coverage of the leaves and shoots should be aimed at. Unprotected areas will serve as places of entry of the pathogen. Some varieties of grapes are scorched by the use of one per-cent Bordeaux mixture at this stage. Therefore a weaker mixture (3: 3: 50) is recommended for use at this stage.

3. *Before flower opening*: Spray Bordeaux mixture one percent (5: 5: 50) or Cupravit ob 21. In case the weather is dry, sulphur dusting may be carried out. Never spray or dust when the flowers are open.

4. *After fruit set*: Spray one per cent Bordeaux mixture or Cupravit ob 21.

5. *On young bunches*: Dust sulphur if the weather is dry. Under humid conditions spray Bordeaux mixture or Cupravit ob 21. One dusting with sulphur on very young bunches is always beneficial.

The necessity for further sprayings will depend upon the weather conditions. If humid weather persists or heavy dews or rains are prevalent or forecasted further spraying of the bunches and shoots will be necessary.

All prunings of diseased materials should be carefully collected and destroyed either by burning or by deep burial in the soil.

Sometimes yellowish mottling of the leaves is observed. This is a sign of lack of availability of zinc salts to the vines. It may be rectified by mixing 1 to 2 lb. of zinc sulphate in 50 gallons of Bordeaux mixture or other copper fungicides used for spraying the foliage. Bordeaux mixture spray in the later stages when the bunches are maturing may leave stains on the fruits and thus affect their market value. Later sprayings may be carried out with Cupravit ob 21 which does not leave a visible stain on the fruits.

The diseases are usually spread to new plantations through the dormant mycelium in the cuttings selected from diseased gardens. Therefore care should be taken to select the cuttings from healthy gardens.

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3. — — — Leaflet No. 8 of 1931., Dep. Agri., Bombay.

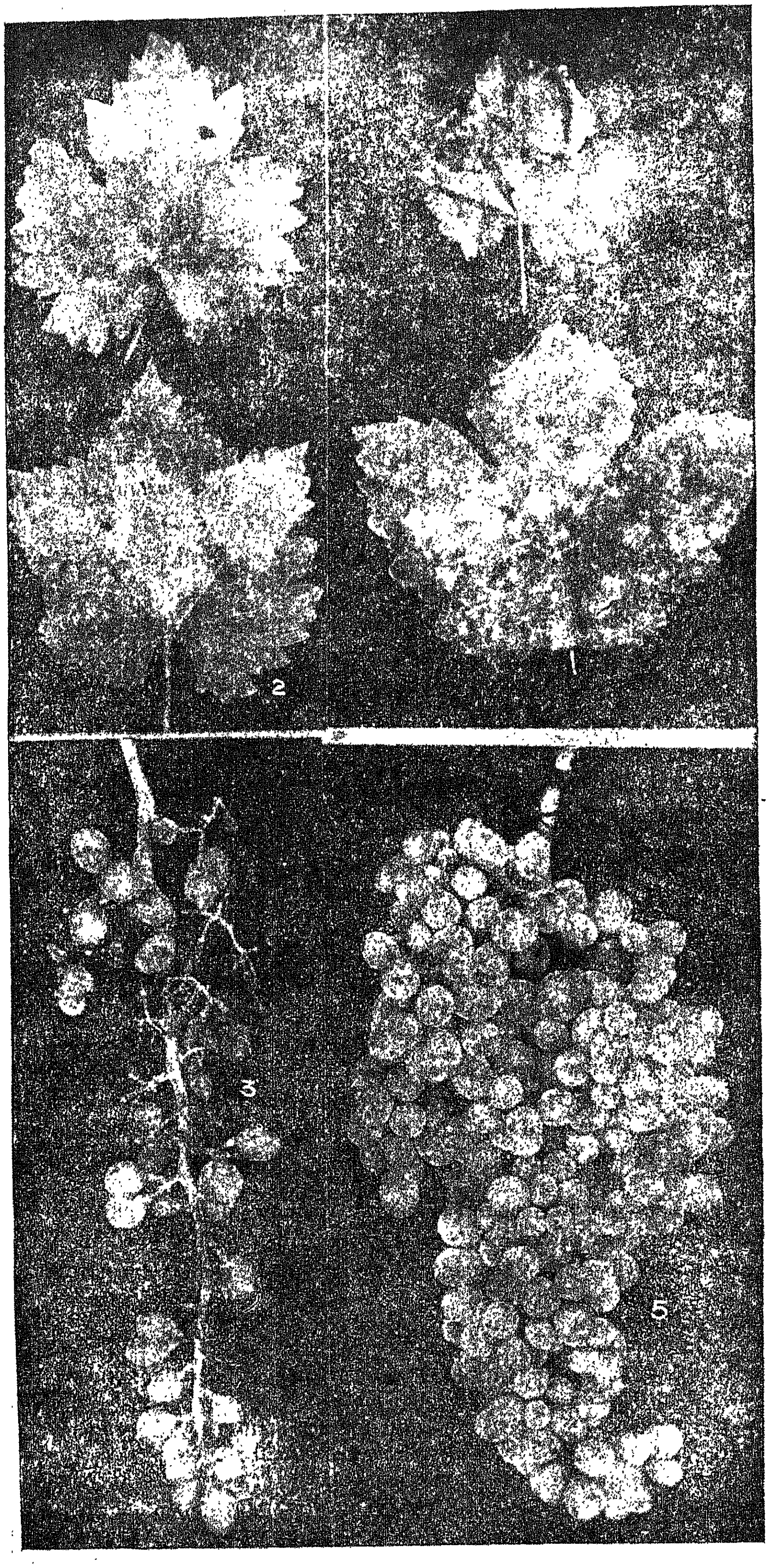

PLATE I

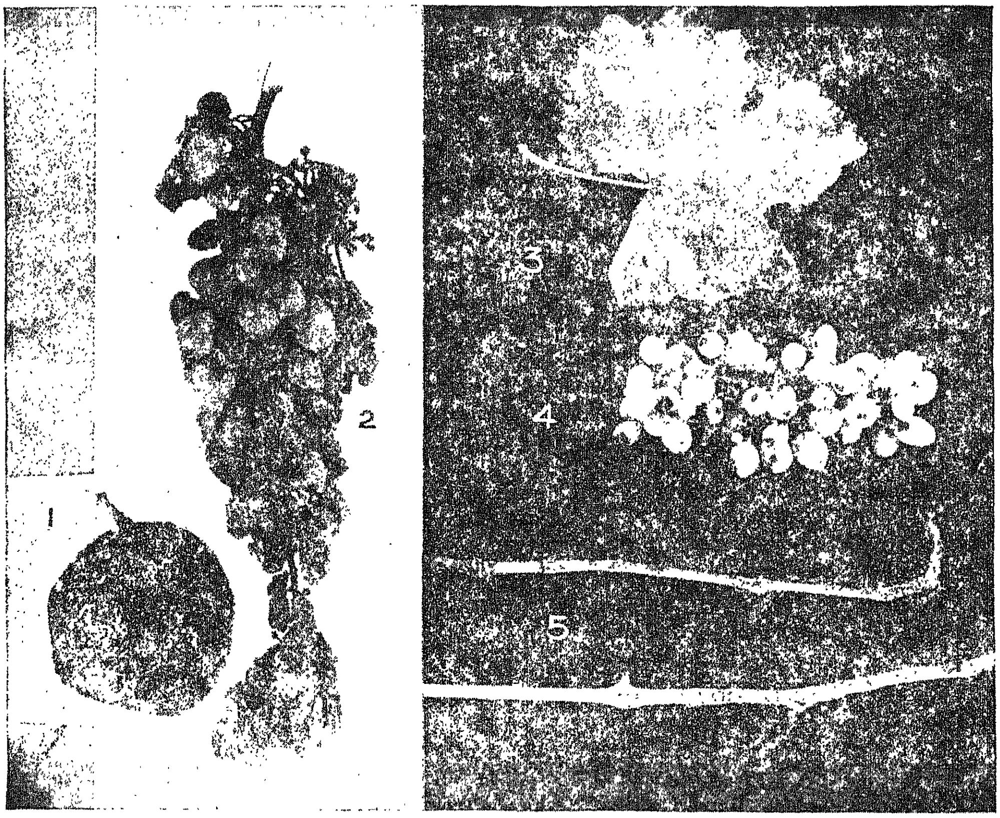

PLATE II

EXPLANATION OF PLATES

PLATE I. FIGS. 1 — 3: *Downy mildew:* (1) Upper surface of an infected leaf, (2) lower surface of an infected leaf showing the downy growth of the fungus, and (3) an infected bunch.

FIGS. 4 & 5: *Powdery mildew:* (4) Infected leaves, and (5) an infected bunch.

PLATE II. FIGS. 1 & 2: *Black rot:* (1) An individual infected berry showing the pycnidia (enlarged), and (2) an infected bunch.

FIGS. 3 — 5: *Anthracnose:* (3) An infected leaf showing the spots, (4) an infected bunch, and (5) severely affected canes.

A Retrospect

by

W. ODONGO OMAMO,

(Scholar from Kenya, studying at the Agricultural College, Coimbatore)

Four years have elapsed since the birds and butterflies of Bharat and the twinkling stars of the East welcomed me and quickened my pace to tread upon the holy lands that have borne and witnessed the great heroes of peace. I wondered at the lands that have from time immemorial, fed mankind with milk and honey-the sacred lands of Rama and Sita.

In person, have I witnessed the Punjabi Farmer toiling in the processing of his wheat at the height of summer when the shade temperature touches 118°F. Singularly have I been rewarded with the exemplary tenacity of the South-Indian ryot, who armed with the sickle, the mammatti, the handhoe and the country plough manages with the help of cows, bullocks and buffaloes to tickle the motherland to laugh with the harvest. The illustrious farmers of Tanjore, Malabar, South Kanara and Coimbatore, for example, and the selfless tenants and mazdoors as a whole, cannot but flood my heart with the melodious tune of the farmers of yore, who sang thus:—

"A little land to till,
A little barn to fill,
A little girl to marry,
Give me, give me,"

Yes that has been the India of my sojourn during the course of my studies here.

But now when I cast my eyes across the Arabian Sea and spot out the petty farmers of Kenya, eking out existence in a land that is second to none in offering possibilities for Agricultural developement, when I now put on the "glasses" and look at the great River Valley Projects of India and then focus on the numerous untamed rivers of Kenya, chuckling and roaring, rolling and tumbling and girdling the countryside with threads of silver; when I recollected with fear, the teaming insect pests and fungal diseases that inflict material losses to the farmers year after year, and when I view the economy of Kenya and detect the important role Agriculture has to play in the economic uplift of the country, I feel it my duty to recommend to technicians, who take pride in the betterment of Agriculture the world over, to cast their eyes across the Arabian Sea and render what service they can towards the realisation and enhancement of Agricultural Production in Kenya. May I for one use my influence with our College to appeal in particular to the Agricultural workers of South India, to try earnestly to cross over and witness the enchanted valleys, scrublands, savannahs and highlands of Kenya, to cross over and bathe in the fresh waters of the great Victoria Lake and smile with the perpetual snows of Mount Kenya and Mount Kilimanjaro, to cross over and diffuse into the Multiracial Society of ours, to cross over and ennoble Agriculture, nay,to cross over and serve humanity.

Research Note.

An Abnormal Fruit of Apple (*Pyrus malus*)

The genus *Pyrus* is characterised by the terminal clusters or corymbs of flowers which are epigynous, pentamerous and with syncarpous ovaries. The apple (*Pyrus malus*) has also pentamerous, pinkish flowers which are always borne in terminal clusters.

In one of the varieties of apple, viz., Winterstein, an abnormal fruit in which two fruits had fused together, was noticed. (Fig. I) One of the fused portions was slightly smaller than the other. The fruits had fused together even in the early stages as evidenced by the presence of a thick stalk which is a fusion of the pedicels of two flowers. The examination of the cross sections of these fused fruits revealed five segments each representing the five celled nature of ovary in tact (Fig. II) showing further evidence that this a clear case of fusion of two individual flowers at the very early stages itself and that it is not as a result of the freakish development of the carpels of single flower.

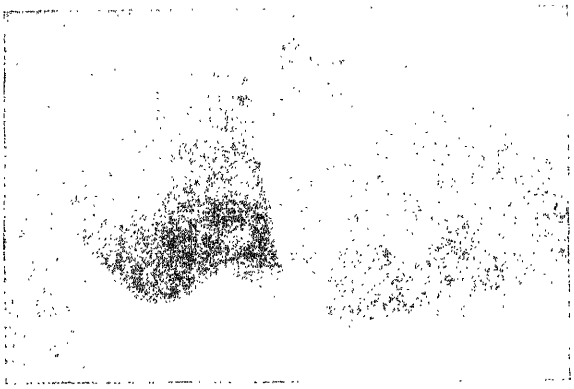

FIG I

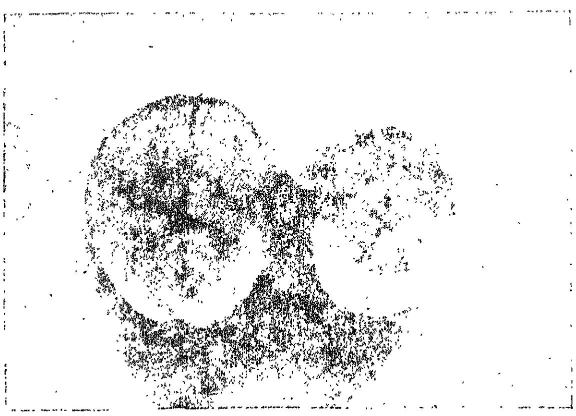

FIG II

Such abnormalities has not been noted in apple as far as the author is aware. No definite causes could be put forward for this occurrence.

Raj Bhavan, Ootacamund,
January, 1955.

V. SAMPATH.

GLEANINGS

Making Eggs last longer: Lime water Treatment: Villagers engaged in the egg trade suffer heavy losses, especially in the hot weather, due to the eggs going bad in transit. This happens because of the development of the embryo inside them. Eggs will not go bad as quickly if they are treated with lime water, if has been found at the Indian Veterinary Research Institute, Izzatnagar. Lime water is prepared by mixing freshly slaked lime with plenty of water diluting it to form a thin white wash. Stirring it frequently for two or three days and then pour off the thin milk of lime suspension. Eggs are kept completely emersed in earthen-ware or similar containers holding the thin liquid. The excess lime which settles down to the bottom will serve to keep up the strength of the solution. Water is added at it is lost by evaporation from time to time and the eggs are kept completely submerged. By this method eggs will remain good in Nothern India for up to four months in the winter and up to about ten days in the summer, depending upon the intensity of the heat. The shell pores are sealed in eggs stored for a day in lime water. This improves keeping quality.

[ICAR Farm News Release No. 24]

Tobacco seed need not be wasted: Profitable utilization by farmers: Research has found many uses for tobacco seed which is generally allowed to waste. India annually produces about 5,000 tons of this seed. Among some of the new uses, Research has shown that if ground into fine paste a good cattle feed can be prepared out of tobacco seed. The feed does not contain nicotine or any other harmful substance. Tobacco seed oil, like the seed, can be used for culinary purposes and as a semi-dry oil for paints and varnishes. The oil is better than linseed oil because it does not turn yellowish on keeping. The oil burns readily, giving a mild and smokeless light. It also is a deterrent, to a small extent, to white ants. The oil cake is cheaper than other cakes. It is good as a feed for cattle and horses or for manuring sugarcane or rice. Like the seed, tobacco dust and waste have been shown to be useful in other ways. The dust when applied to the tobacco crop over a basal dose of groundnut cake increases yield and makes the crop mature early. Applying the stem dust to the field increases the organic matter in the soil. [ICAR Farm News Release No. 25]

Planning Potato: Right size of Planting Material: Experiments at the Indian Agricultural Research Institute, New Delhi, show that the bigger the size of the potato tuber used in planting, the lower is the percentage of large-sized turbers produced. This behaviour of the potato can be used to profit. If, for example, the crop is being grown for seed purposes, where big-sized tubers are not required, seed tubers of a bigger size should be planted. If a greater percentage of big-sized tubers is desired in the produce, seed tubers of a comparatively smaller size should be planted. [ICAR Farm News Release No. 28]

Best Results with Hatching: Points in selection of Eggs: Poultry keepers will have to pay sufficient attention to the selection of eggs for hatching, if they want the best chickens For improved breeds, setting eggs should not be more than two ounces in weight each. The eggs should be of a good regular oval shape. Eggs of an abnormal size or shape, too pointed or round, or otherwise not symmetrical should be avoided. A simple test to find out whether the eggs selected are sound would be to tap two eggs together. If any egg is weak or has a cracked shell, it will produce a dull sound. Dirty eggs should be avoided for hatching. If a dirty egg is otherwise sound, it should be cleaned with a knife or stiff brush and not by washing. Eight to ten eggs are a convenient number for setting under Desi hens. Fresh eggs should always be used and they should be stored in a cool

and somewhat moist atmosphere. In the winter or in the hills, eggs can be stored for seven to ten days and in the summer or in the plains for three or four days.
[ICAR Farm News Release No. 27]

Select your own seed: Better seed leads to higher maize yield: Maize, like other crops, yields better if selected seed is used for sowing. Experience in maize cultivation on research farms shows that selection of seed is best done when the crop is still in the field. Large sized, well filled cobs should be selected from plants bearing more than one good cob. Only healthy plants growing under normal conditions, and not such as these growing near water chanels or on the borders. Cobs should be selected from plants bearing them at a height of three to four feet above the ground. If cobs are borne higher, plants are liable to lodge, and if too low, wild animals will damage them. In unirrigated areas, plants with narrow leaves should be preferred while for irrigated lands board-leaves be selected. After the cobs are selected, they must be thoroughly dried in the sun before storing. Shelling at the time of sowing should be done by hand, and not by beating them with sticks. [ICAR Farm News Release No. 29]

Oil and Fodder from Safflower: As much as a ton of oil seed per acre has been harvested from safflower crops. Apart from the commercial value of the oil, the residue of the seed is useful stock food, rich in proteins, and the plant itself can also be used as fodder for sheep and cattle. So far no serious pests have been known to attaak the plant in Australia, and it also has a greater drought resistance than most other economic plants.

Better Pastures for Cattle: A feature of the increasing interest in Australia was that graziers were incorporating legumes in their pastures. By including legumes the carrying capacity could be increased by two-thirds. Flinters grass had shown a remarkable response after it had been lightly cultivated. Up to three tons of Flinders grass hay had been harvested from the stands compared with the usual 15 cwt. On irrigated areas in the Burdekin district, carrying capacity had been doubled and it was possible to grow and fatten double the quantity of cattle and to put bloom on them in from two to three months.

Seaweed as stock food: Seaweeds common to the Australian coast could become a valuable stock feed, the seaweeds compare well with land plants as a source of nutriment for they contain a high proportion of carbohydrate, though their protein is less easily used than animal protein. They are valuable sources of minerals and vitamins, an important contribution to the animal diet, and pigs, sheep and horses can benefit from the inclusion of seaweed meal (approximately 10 to 20 per cent) in their food. Poultry food trials have been encouraging, but more than 10 per cent of the meal upsets the mineral metabolism of the birds. Trials in Scotland suggested that cows find seaweed meal rather unpalatable, but when it was accepted there was a positive response in the fat content of the milk.

In Australia the giant brown seaweed Macrosystis pyrifera should be particularly suitable for harvesting commercially. In Tasmanian waters it is estimated that, on the basis of three harvests a year, a minimum of from 35,000 to 44,000 tons of air-dried weed could be obtained from the 30,000 acres of sea-beds already surveyed. [Australian Agrl. Newsletter No. 461]

Maize needs heavy manuring: Placing of Fertilizers gives better yields: Maize needs heavy manuring to yield well. If the land is moderately fertile, 250 to 300 maunds of farmyard manure should be ploughed in three to four weeks before sowing the seed. Good results are obtained when 100 to 150 lb. of ammonium sulphate is applied as top dressing when plants are nearly a foot high. If farmyard manure is in short supply, use a mixture of one maund of ammonium sulphate

and one maund of triple superphosphate for every 50 maunds of the manure in shortage. This mixture is best applied about two to two and half inches below the seed row at the time of sowing. This can be done by tying a metal tube *(para)* behind the country plough, and dropping the fertilizer uniformly through the tube. Experiments have shown that this method gives better results than when fertilizers are broadcast the usual way. [ICAR Farm News Release No. 31]

Marble Disease Kills Cardamom: Experience points to effective control measures: Farmers growing cardamom are familiar with the marble or *Katte* disease which is very destructive. When the disease appears continuous streaks running from the midrib to the margin of the leaf are seen. In older plants, the disease reduces the shoots producing the fruits and the tillers so that within a year the crop becomes useless. Experience shows that the best way of eradicating the disease is to completely destroy all old and diseased plants, rouge out diseased plants from the plantation at regular intervals and transplant healthy seedlings raised under disease-free conditions. This, however, it is pointed out, can be done successfully only if all farmers extend their full co-operation in the work.
[ICAR Farm News Release No. 32]

Flat sowing has advantages: Simpler way of Planting Potatoes: The common practice of sowing potato in ridges is laborious and expensive. Flat sowing gives as good results as ridge sowing. This is done by opening the furrows with a country plough or with a horse hoe if fertlizers are to be applied, and then two planking to cover the seed. Right spacing and straight furrows are, however, essential for intercultivation. Hoeings can be done cheap with horse hoe or bullock cultivator. Hilling or earthing up can also be done in the same way. Earthing up, however, should be done at the right stage of the crop. Done too early it will bury young plants and done too late, it will damage shoots which have grown too long. For this operation, working a horse hoe first and a ridge plough next have given good results. [ICAR Farm News Release No. 33]

Pest-Free Orange Crop: Systematic removal of Affected twigs recommended: Farmers growing mandarin oranges sometimes meet with the orange borer trouble. The pest decreases yields to a great extent. Elaborate experiments conducted in Malabar (Madras State) where the pest was assuming importance showed that a systematic removal of wilted twigs by means of a long pole with a forked end kept the pest under control. As the beetle is found throughout the rainy months of June and July the removal of the wilted twigs should commence by July and continue till August-September. If this initial treatment is not done, the pest thrives. The borer attack can be seen by the throwing out of chewed up fibrous material through the holes bored by it in December-January. At this stage it has been found that pumping in small quantities of petrol with a syringe or oil can into the bore-holes and blocking them with clay or earth is sufficient to kill the beetle. The treatment, however, must be done at least thrice to kill the pest completely. Both the methods are cheap and can be easily undertaken by orange growers.
[ICAR Farm News Release No. 34]

Use of Streptomycin dust to control Fire Blight: Peter A. Ark: Plant disease reporter Vol. 37 (7) July, 1953: Pears are affected by the Bacteria *Erwinia amylovora* during and subsequent to the blossom phase. For a number of years both spraying and dusting with copper containing materials during blossom time has been employed with great deal of success. But successful control depends upon proper timing. However, in some situations, use of copper to control fire

blight results in a considerable russetting of fruit. In a search for new chemicals to control the bacterial disease of plants various antibiotics were tested. The high degree of plant tolerance for streptomycin encouraged the use of this antibiotic in fire blight work. Priliminary tests showed that the blossoms were not injured by concentration ranging from 30 to 400 ppm. Streptomycin gave good performance not only in blight control but also in causing not fruit russetting. The latter quality of the streptomycin makes it a desirable substitute for copper if subsequent tests under varied orchard conditions show considerable results.

[N. V. S.]

CROP AND TRADE REPORTS

Crop-Sugarcane-Third Forecast Report-1954—'55-Madras State: The area under sugarcane in the Madras State upto 25th December 1954 is estimated at 108,900 acres (95,160 acres under planted crop and 13,740 acres under ratoon crop). Compared with the area of 106,800 acres (93,260 acres under planted crop and 13,540 13,540 acres under ratoon crop) estimated for the corresponding period of last year, this is an increase of 2·0 per cent Compared with the average area of 104,719 acres for the five years ending with 1953—'54, the present estimate is an increase of 4·0 per cent. An increase in area is estimated in the districts of South Arcot, North Arcot, Salem, Malabar and South Kanara and a decrease in area in the district of Ramanathapuram. The area estimated is the same as that of last year in all the other districts of the State except the Nilgiris where the acreage under the crop is little or negligible. The harvest of the crop has commenced. The yield per acre is estimated to be slightly below normal in all the districts of the State.

The seasonal factor for the State as a whole works out to 95 per cent of the normal as against 97 per cent of the normal estimated for the previous year. On this basis the the total yield works out to 2,830,350 tons of cane, the gur equivalent of which is 309,550 tons as against 2,853,100 tons of cane with a gurequivalent of 313,270 tons estimated for the corresponding period of previous year and an average production of 2,581,040 tons of cane with a gur equivalent of 283,290 tons representing a decrease of 1 2 per cent and an increase of 9·3 per cent respectively. The average wholesale grice of jaggery per maund of 82 2/7 lb or 3200 tolas at important market centres on 29—1—55 was Rs. 14—11—0 in Mangalore, Rs. 12—5—0 in Cuddalore, Rs 10 3—0 in Tiruchirapalli, Rs. 9—15—0 in Erode, Rs. 9—0—0 in Vellore, Rs. 8—13—0 in Coimbatore and Rs. 7—9—0 in Salem. Compared with the prices which prevailed in the corresponding period of the previous year, these prices show a decrease of 46·4 per cent in Coimbatore, 45·5 per cent in Vellore, 42·4 per cent in Salem, 38·1 per cent in Erode, 37·7 per cent in Cuddalore, 37·5 per cent in Mangalore and 30·3 per cent in Tiruchirapalli.

COLLEGE NEWS AND NOTES

The students gave a farewell party to Sri C. Rajasekhara Mudaliar. Systematic Botanist and Professor of Botany, on 5—2—1955 on the eve of his retirement.

The final year B. Sc. (Ag.) students went on an educational tour between 11—2—1955 and 28—2—1955. They visited Bangalore, Mandya Mysore, Madras, Palayakottai and Tirupur.

The Wardens and students of the College Hostel celebrated the Hostel Day on 12—3—1955. Sri P. K. Nambiar, I. A. S., Collector of Coimbatore presided over the function. Srimathi Gowri Nambiar distributed the prizes.

Sri William Odango Omamo gave a good will party to the staff and students of the College on the eve of his departure to Africa soon.

Weather Review — For the month of February, 1955.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January	Division	Station	Total for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam)	0·0	— 0·4	4·6	South	Madurai	0·0	— 0·5	0·3
	Tirurkuppam*	0·0	— 0·2	4·9		Pamban	0·7	— 0·2	5·9
	Vellore	0·0	— 0·3	1·8		Koilpatti*	0 0	— 1·3	2·5
	Gudiyatham*	0·0	— $£_1$	1·8		Palayamcottai	0·0	— 1·2	1·9
						Ambasamudram*	0·0	— 1·7	4·9
East Coast	Palur*	0·0	— 0·3	2·6	West Coast	Trivandrum	0·3	— 0·2	0·9
	Tindivanam*	0·0	— 0·3	0·5		Fort Cochin	0·9	+ 0·1	1·0
	Cuddalore	0·0	— 0·9	1·9		Pattambi*	0·0	— 0·8	0·0
	Nagapattinam	0·8	— $£_2$	3·5		Kozhikode	0·2	— 0·5	0·4
	Aduturai*	0·5	— 0·3	1·5		Taliparamba*	0·0	— 0·2	0 0
	Pattukottai*	0·0	— 1·0	3·2		Wynaad*	0·0	— 0·7	0·0
						Nileshwar*	0·0	— 0·1	0·0
						Pilicode*	0·0	— 0·1	0·0
Central	Salem	0·1	— 0·3	0·1		Mangalore	0·0	— 0·2	0 0
	Coimbatore (A. M. O.)*	Tr.	— 0·2	0·3		Kankanady*	0·0	— 0·1	0·0
	Coimbatore	0·0	— 0·4	0·6	Hills	Kodaikanal	0·0	— 1·5	2·4
	Tiruchirapalli	0·2	— 0·1	1·0		Coonoor*	0·5	— 2·1	4·9
						Ootacamund*	0·0	— 0·5	0·9
						Nanjanad*	0·0	— 0·6	0·7

Note :—1. * Meteorological Stations of the Madras Agric. Dept.
2. $£_1$ = Actual deviation is 0·02″.
3. Tr. = Trace (0·01″ to 0·04″)
4. $£_2$ = Actual deviation is 0·03″.

The month began with a dry weather which lasted for two days. On 3—2—1955 localised showers were received at Minicoy and on the next day fairly widespread showers were received in Travancore Cochin. Except for half-an inch of rain at Minicoy on 5—2—1955 the weather continued to be dry upto 12—2—1955. On 13—2—1955 Nagapattinam received quarter inch of rain. Though light, showers were fairly wide-spread in South Tamilnad, Malabar and South Kanara and also at a few places in North Tamilnad. The weather became dry again and remained so till 21—2—1955. On 22—2—1955 Pamban received quarter inch of rain. Cochin recorded half-an-inch of rain on 24—2—1955 and light showers were received practically throughout Travancore-Cochin on the next day. In the last three days of the month the weather was practically dry throughout the State.

Summer conditions set in over the entire country on 26—2—1955.

The note-worthy rainfalls and the zonal rainfall in inches are furnished hereunder :

Note-worthy Rainfalls			Zonal Rainfall			
Date	Name of Place	Rain-fall	Name of Zone	Av. rainfall for Dec.	Dep. from normal	Remarks
4/2/55	Alleppey	1·5	North	Nil	— 0·2	Below normal
14/2/55	Madras (Nungambakkam)	1·0	East Coast	0·2	— 0·5	do.
			Central	0·1	— 0·3	do.
			South	0·1	— 1·0	Far Below normal
			West Coast	0·2	— 0·3	Below normal
			Hills	0·1	— 1·2	Far Below normal

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 11—3—1955.

C. B. M. & M. V. J.

BOOK REVIEW

APROZ (Estudo Botauico) by Joao de Carvelho E. Vasconcellos. Ministry of Economics - Lisbon, 1953.

In the present work the writer treats rice organography as an identification basis for varieties (cultivated forms), referring to the characters of seed, root, tillering, stem, leaf, vegetative organs' pigmentation, peduncle, panicle, pedicel, spikelet, glume, lemma and palea, stigma and caryopsis.

Aspects of plant physiology, from nutrition and metabolism to growth and development, including reproduction and maturity, are referred to afterwards. Immunity and resistance to diseases are also examined.

The author also studies the origin of the rice and systematics of *Oryza sativa L.* considering the following subspecies: *sativa*, *japonica* Kato, *brevindica* (Porteros) Vasc. and *brevis* Gustchin.

Keys for classification of botanical varieties are also supplied in this book.

At last, are described the varieties (cultivated forms) cultivated in Portugal, and those found as impurities in rice fields.

A table, at the end of the work, shows the relative importance of the different forms existing in Portugal.

[A. M. K.]

DEPARTMENTAL NOTIFICATIONS

Gazetted Service — Postings and Transfers

Names and Present post	Posted as
Krishnamurthy, R., Agronomist, Satyamangalam,	Asst. Cotton Exten. Officer, Coimbatore.
Krishnamurthy, P. N., Asst. Cotton Exten. Officer, Madurai,	Asst. Cotton Specialist, Coimbatore.
Kesava Iyangar, N., Asst. Cotton Exten. Officer, Coimbatore,	Cotton Specialist, Coimbatore.
Mohamad Abbas, On leave.	Spl. D. A. O., Crop Sampling, Madras.
Ponnaya, B. W. X., Supdt. A. R. S., Koilpatty,	Asst. Millets Specialist, Coimbatore.
Ramabadhran, G., Asst. in Millets, Coimbatore,	Supdt. A. R. S., Koilpatty.
Shanmugasundaram, A., Asst. in Paddy, Coimbatore,	Supdt. A. R. S , Palur.
Thomas, K. C., Asst. Marketing Officer, Madras,	Asst. Marketing Officer, Coimbatore.

Upper Subordinate — Postings and Transfers

Names and present post	Posted as
Arumugham, S. V., P. P. A., Coimbatore,	A. D., Virudachalam.
Anantaraman, P. V., Asst. in Millets, Coimbatore,	Paddy Asst. Coimbatore.
Azimuddin, Spl. A. D., Nilakottai,	P. A., to D. A. O., Vellore.
Balagopalan, A., Ent. Asst. Kasargode,	A. D., Gingee.
Baskaran Nambiar, K., Paddy Asst. Pattambi,	A. D., Madurai.
Chinnamani, S., Asst. in Plant Physiology, Coimbatore,	Cotton Asst. Coimbatore.
Chandrasekharan, P., Asst. in Paddy, Coimbatere,	Asst. in Cyto-Genetics, Coimbatore.
Chockalingam. C. D., Exten. Officer, Kadambathur,	A. D., Saidapet.
Fernandez, A.	A. D., Madurantakam.
Gopalakrishnan, K. Paddy Asst. Mangalore,	A. D., Ramapuram, Coimbatore.
Gopalan, O. S. Asst. Pollachi,	O. S. Development, Asst. Trichy.
Iyamperumal, S., Certification Inspector, Pollachi,	Certification Inspector, Srivilliputhoor.
Jayaraja, R., P. P. A., Pattukottai,	A. D., Gramasevaks Training Centre, Pattukottai
Jayaseelan, A. D., Mandakalathur,	A. D., Madanam.
Kaliappan, R., P. P. A., Myco.,	F. M., A. R. S., Bhavanisagar.
Kalyanaraman, V. M., Quality Inspector, Tirupur,	Ent. Asst. Coimbatore.
Kamalaksha Naik, Mangalore,	Chemistry Asst. Coimbatore.
Krishnamurthy, P. S., A. D., Uthukottai,	Ext. Officer, Kadambathur.
Kamalanathan, S., Certification Inspector, Gobi,	Certification Inspector, Rajapalayam.

Names and Present Post	Posted as
Loganathan, N. S., O. S., Asst. Tindivanam,	O. S., Asst. Pollachi.
Mohd. Sultan Mohideen,	A. D., Mailam.
Manamohan Lal, S., A. D., Mettupalayam,	Paddy Asst. Palur.
Mahadevan Pillai, K., Cotton Asst. Koilpatty,	A. D., Trichendur.
Masilamani, S , A. D., Coonoor,	Soil Conservation Asst. Kothamangalam.
Muddappa Gowda, P., A. D., Ramapuram,	O. S., Asst. Nileshwar.
Nagarajan, V.,	A. D., Kanjeevaram.
Natarjan, L. R., Ent. Asst. Coimbatore,	P. P. A., Myco., Ootacamund.
Oblichetty, T. V., A. D., Cheyyur,	Sugarcane Asst. Gudiyattam.
Premsekher, S., Asst. in Potato,	Asst. in Millets, Coimbatore.
Ramanathan, N., Paddy Asst. Palur,	A. D., Cuddalore.
Rangaswami, S., Cotton Asst, Palur,	A. D., Tiruvadanai.
Ramalingam, M., Sugarcane Asst. Gudiyattam,	A. D., Cheyyur.
Ramanujam, K.,	Myco Asst. Coimbatore.
Ramachandran, S., P. A., to D. A. O., Vellore,	Ext. Officer, in Agri. Sankarankoil.
Radhakrishnan, T. V., Udamalpet,	Certification Inspector, Sankarankoil.
Srinivasamurthy, M., Cotton Asst. Periakulam,	A. D., Tindivanam.
Sampath, V., Garden Overseer, Ooty,	Fruit Asst. Coonoor.
Subbiah, K. K., Ent. Asst. Coimbatore,	A. D., Mettupalayam.
Subramaniam, C. P., Madukarai,	P. P. A., Myco., Coimbatore.
Sundaraj, M. S., Fruit Asst. Coonoor,	A. D., Coonoor.
Srinivasan, M. P., Ent. Asst. Tarakad,	Ent. Asst. Kasargode.
Shanmugam, C. T., O. S. Dev., Asst. Coimbatore,	F. M., A. R. S., Bhavanisagar.
Swaminathan, A. D., Trichy,	A. D., Bhavanisagar.
Shanmuga Vinayagam, C., Ext. Officer, Sankarankoil,	A. D., Grama Sevaks Training Centre, Kallupatty.
Sethuraman, V., Certification Inspector, Tirupur,	Certification Inspector, Rajapalayam.
Thyagarajan, S. R., Myco. Asst. Coimbatore,	Paddy Asst. Coimbatore.
Vital, S. M.,	Ent. Asst Coimbatore.
Venkataraman, K.,	Millets and Pulses, Asst. Coimbatore.
Viswanathan, P. S., A. D., Tiruvadanai,	Plant Physiology Asst. Coimbatore.

Supplement to the Madras Agricultural Journal

Marketing Committee Chronicle

The Role of the Exporting Firms in South Arcot District in the Purchase of Groundnut Seeds before and after the World War No. II

by

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The Chief Exporting Firms in South Arcot District are Messrs. Rallis India, The East Asiatic Company (India) Ltd., and Louis Dreyfus Company Ltd., They have their buying organisation spread over the principal assembling centres of the District. They purchase groundnut kernels both on ready and on contract basis. Before the War as also in its initial stages they were purchasing nearly 90% of the marketable surplus, which was in turn handled, manipulated and exported from the Port of Cuddalore Old Town. The quantum of seeds purchased and subsequently exported from Cuddalore Port in the year 1939 as also in the succeeding years upto 1945 during the War period is given below. The quantity dealt in trade annually in South Arcot District in this period would reveal the glaring fact that these firms had virtually a monopoly in the purchase of groundnuts which was exported to Foreign Countries. The following are the tables for the year 1939 to 1945.

Year	Quantity actually marketed in the District (in Tons)	Quantity purchased by the Firm (in Tons)	Quantity Exported outside India from Cuddalore O. T. Port (in Tons)
1939	90500	74800	75700
1940	64500	58050	79211
1941	89776	80798	65601
1942	66130	52000	35770
1943	86844	71600	80000 *
			* To Madras for shipment.
1944	87600	49200	48000
1945	72900	50658	40508

The Export was made largely to United Kingdom during the above period on account of War. The Ministry of Food at London were the sole purchasers of groundnuts upto the year 1946. These companies have their head offices in Europe with local agencies at Madras and other states with buying sub Agencies spread all over the producing areas and have been handling major portion of the country's export trade. The Union Government with a view to encourageing Indian dealers introduced the quota system for export of seeds and oil by which a certain percentage of export quota was set apart for the new comers for distribution. But much business could not be done by the Indian Exporters for want of trade facilities and organised brokers in foreign countries where these commodities are in demand. These companies have not only an advantage over the Indian Exporters in their buying organisation but have also large capital to invest in the trade with the result that they were virtually having a monopoly in the Groundnut Market both in the fixation of prices and in the matter of buying the entire output in the district. Besides they have always the advantage of deriving profits accuring out of price fluctuations which this crop is often subjected to, because the firms have the financial strength to hold on the accumulated stocks for months together when the prices are not favourable to them. Their day to day buying prices were the ruling market rates based on which alone the other trade interests operated in the market because the accumulated stocks of the traders had in turn to be sold ultimately to the companies. The Sub Agencies numbering about 22 of the three Exporting Firms were established in all the assembling centres of the District before and also for a few years during war till 1945. They purchase groundnuts according to instructions from their head office at Madras which usually is the controlling office. The goods are purchased on basis of visual examination and direct bargaining and these transactions are called ready or spot purchases. They also purchase goods on contract basis from the traders either for immediate delivery or for delivery within a stipulated time usually not more than a month. The contract purchases might be on Agency Pass or Port Pass Basis. By Agency Pass it is meant that the sellers have to deliver the contracted goods at the Sub Agency's godown subject to conditions of contract and take payment after settlement in full, by Port Pass it is meant that the sellers consign the goods to the sub agency at a specified Port and hand over the Railway Receipt to the buying Sub Agent who advances 90% of the value of the goods. The goods are thereafter analysed at the Port and if they are upto the specification in the contract form, the balance value of 10% is paid to the sellers by the Sub Agency If the goods tendered are found to be below specification of the contracted terms, deduction of sums calculated in lieu of the allowances towards quality and standard are made from the balance of 10% value to be paid to the seller at the time the final settlement bill is made.

But after the advent of the World War No. II and with the capital investment of Indian traders, many oil mills have come to stay in South Arcot District. The gradual increase in the internal demand of oil for edible and industrial purposes, of cake for manuring and cattle feed in the country had also *contributed further fillip* to expand the crushing industry all over the State especially in only type South Arcot which was having only one oil mill, about 25 hand presses and about 4 to 5 thousand country chekkus in 1939 as against 67 Expellers, 56 Rotaries 15 hand presses and about 1,000 country chekkus engaged in the crushing of groundnuts today. The Exporting Firms who were hitherto purchasing nearly 90% of the produce marketed annually in South Arcot through their Sub Agencies have only a limited number of nine buying agencies at present with only a portion of the marketable surplus as purchase to their credit. The following figures of spot and contract purchases of the three firms for a few years after 1946 would reveal the less important role the foreign exporters have been playing in the matter of purchases of groundnut in the District.

Year	Spot Purchases in Tons	Contract Purchases in Tons
1946	5,704	10,007
1947	5,797	11,170
1948	7,440	1,325
1949	18,435	1,977
1950	11.972	3,392
1951	11,488	906
1952	8,567	221
1953	8,833	4

They are not exporting seeds at present from the Cuddalore O. T. Port; nor have their prices any bearing on the day to-day ruling market rates. They have established oil mills at two important assembling centres, where the goods purchased at various sub Agencies within the District as also of the Sub Agencies outside the District in North Arcot, Salem, and Tanjore etc., are transferred and stocked for crushing. Besides they also engage some of the oil mills in the District during season time for crushing on hire basis.

A comparative statement of the off take of the different trade interests including the three Exporting Firms from the Regulated Markets of the Committee for the years 1948 to 1953 would reveal the fact that a thorough change in the pattern of trade in South Arcot has been brought about by the development of crushing internally. The change is perceptible mainly because of the keen competition offered by

the Indian traders both in the matter of buying and crushing. The minimum overhead charges on establishment for buying the produce, the moderate capital required for the trade, the availability of groundnut seeds almost throughout the year, the easy accessibility to Madras for selling the manufactured oil and the ever increasing demand of cake both internally and externally contributed to the growth of the oil crushing industry in this district, displacing the all powerful Exporting Firms, monopolising the distribution of groundnuts till now. The following tabular statement would demonsrrate the relative importance of the Exporting Firms and other trade interests in South Arcot in the matter of buying groundnut.

Year.	Total Quantity dealt in Regulated Markets.	Total Quantity purchased by the Firms.	Total Quantity purchased by other traders including Chekku owners & Oil Mill owners.	Total Quantity purchased by traders ouistde the Dt. eventually for crushing.
1948	31383	3675	15624	12084
1949	48353	11007	18523	12823
1950	48922	8821	25093	15008
1951	49456	6335	27312	15109
1952	41660	6234	24683	10743
1953	40545	6936	27205	7354
Total for 6 years	260319	42058	138440	79812
Average % purchase by each category of traders as against the total quantity handled.		16%	53·4%	30·6%

It will be thus seen that the Exporting Firms who were purchasing nearly 90% of the marketable surplus formerly are now purchasing only about 16% of the total quantity marketed annually. Their presence have no bearing on the present day market which is ruled entirely by the kneen competition exhibited from time to time among oil mill owners whose activities in turn are controlled by the demand of oil at Madras or other places and the supply of seeds in South Arcot.

MARKET NOTES AND PRICES

1. The range of *market prices* for the month of February 1955 :—

For the week ending	Koka	Choll	Malabar supari (Arecaunt)	Mangalore supari (Arecanut)	Copra per candy of 660 lbs.		Coconuts per 1000 nuts
	Rs.	Rs.	Rs.	Rs.	Rs.		Rs.
3—2—1955	65 to 115	150 to 183	115 to 128	122 to 144	250 to 275	R.	160 to 185
						D.	180 to 255
10—2—1955	60 to 105	150 to 180	96 to 116	115 to 138	255 to 280	R.	155 to 175
						D.	175 to 240
17—2—1955	65 to 110	155 to 182	110 to 125	120 to 145	270 to 300	R.	155 to 175
						D.	175 to 240
24—2—1955	65 to 110	No stock	115 to 130	130 to 151	270 to 295	R.	155 to 175
						D.	175 to 240

R. = Raw. D. = Dry.

2. The estimated *stocks* held and exports ("SUPARI") :—

Opening Balance Cwt.	Receipts Cwt.	Exports Cwt.	Closing Balance Cwt.
4,722	35,500	31,113	9,109

The price of "Supari" was firm during the month expect for a slight fall durmg the second week of the month. The price of copra which was low towards the beginning of the month improved stadilp during the month. Coconut prices declined by about Rs. 15/- per 1000.

Mangalore,
7—3—1955.

Secretary,
South Kanara Market Committee.

The Madras Agricultural Journal

Vol. XLII April 1955 No. 4

Editorial

Drink more milk campaign was launched throughout the Madras State in April by the Chief Minister Sri Kamaraj Nadar. The Health Minister Sri A. B. Shetty speaking on the occasion said "to suggest milk diet to our underfed people may seem a mockery like Marie Antoinette asking the poor to eat cake, if they have no bread". "The low consumption of milk in this country is due not only to its high price but also its scarcity." But with the cattle population of India at nearly one fifth of the world, this situation may seem anamolous, but it is really so. Firstly, we have too many scrub cattle eating up the valuable fodder which may be profitably given to other economic breeds. Secondly, the dry cows are not well cared for and it is a simple matter of nutrition that a poorly tended dry cow will turn out to be a poor milch cow. The Government have set up salvage farms for dry cows in Madras and this should go a long way in saving and maintaining valuable animals. We have a duty cast to teach our farmers good methods of breeding and management.

A third factor which has tended to the poor status in our milk industry is the low premium attached to quality in milk in our country. The local milk vendors are able to sell milk at competition rates by making up with water what is lost in price. The twenty milk supply unions of the Madras State have consequently to contend with small traders who stoop to all sorts of adulteration of milk and thus are able to sell milk at a lower price. The consumers with no facility to check up quality on the daily purchase, but carried away by the lower price go in for the local vendors, much to the

detriment of the milk supply unions. If these milk supply unions, which are only collecting and distributing agencies guaranteeing legal standards of milk, find it difficult to vie with local vendors, it would be much more difficult for an efficient dairying concern to put out wholesome milk under pasteurised conditions with its attendent increased cost. This state of affairs in this country is obviously due to the fact that one can practice adulteration of milk with equanimity without any fear of being caught inspite of laws and legal standards existing in the country. For, very few prosecutions really take place. It has to be inculcated into the people at large that the practice of adulteration is as much anti-social and criminal as thieving. Such large scale adulteration can be prevented only by special methods designed to fight the menace. Further, the enforcement of punishment should be quick and deterrent and not a long drawn out litigation as is obtaining now. If all the malpractices in the milk trade are put an end to, quality in milk would be assured. And drinking wholesome pure milk is more important than drinking just more milk, which if contaminated and adulterated would be not only nutrionally incomplete but also dangerously unhealthy.

Recent Advances in Agriculture — Plant Introduction and its Further Possibilities

by

D. DANIEL SUNDARARAJ and D. MEENAKSHISUNDARAM
Systematic Botany Section,
Agriculturral College and Research Institute, Coimbatore

Introduction: In the crop improvement programmes, the introduction of species and varieties forms an integral part. The introduction of plants of economic value from another place where these have already been tried and exploited, is a direct and easy method in agricultural development. In fact, most of the cultivated plants of the various countries are such introductions made sometime or other. DeCandolle (1904) and Vavilov (1931) have dealt extensively on the origin of the cultivated plants. Rajasekhara Mudaliar (1953) has given a complete review of the plant introduction work in the different countries in the recent times in general and has stressed on the aspects of grasses and legumes in particular. Wenholz (1929) mentions that all the chief cultivated farm, fruit and vegetable crops grown in Australia had originally to be introduced from some other part of the world. McCann (1950) says that every major crop grown in the United States of America is an immigrant. In an eminently agricultural country like ours, the importance of plant exploration and introduction needs no emphasis. The former concerns with the search for wild species of economic value for bringing them under cultivation while the latter deals mainly with the introduction of plants of desirable qualities, from foreign countries with the object of improving our cultivated crops.

Significance of Plant Introduction: Some economically useful plants such as food-crops or plants useful as a source of raw material for industries can be *directly utilized* by introducing and cultivating in suitable areas in our country. Rajasekhara Mudaliar (loc. cit.) gives a detailed account of many such introductions made in our country, as Cinchona, Para rubber, Cashewnut, etc., and brings out the possibility of many more introductions. Such additions of new plants of commercial importance and their cultivation on a large scale will bring in industrial development also.

Introduced species and varieties of plants may be useful *indirectly* in increasing the range of material on hand for breeding purposes; it is well known that the chances of producing desired types are dependent upon the initial breeding material. Pal and

detriment of the milk supply unions. If these milk supply unions, which are only collecting and distributing agencies guaranteeing legal standards of milk, find it difficult to vie with local vendors, it would be much more difficult for an efficient dairying concern to put out wholesome milk under pasteurised conditions with its attendent increased cost. This state of affairs in this country is obviously due to the fact that one can practice adulteration of milk with equanimity without any fear of being caught inspite of laws and legal standards existing in the country. For, very few prosecutions really take place. It has to be inculcated into the people at large that the practice of adulteration is as much anti-social and criminal as thieving. Such large scale adulteration can be prevented only by special methods designed to fight the menace. Further, the enforcement of punishment should be quick and deterrent and not a long drawn out litigation as is obtaining now. If all the malpractices in the milk trade are put an end to, quality in milk would be assured. And drinking wholesome pure milk is more important than drinking just more milk, which if contaminated and adulterated would be not only nutrionally incomplete but also dangerously unhealthy.

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Introduced species and varieties of plants may be useful *indirectly* in increasing the range of material on hand for breeding purposes; it is well known that the chances of producing desired types are dependent upon the initial breeding material. Pal and

Ramanujam (1946) have stressed the importance of the introduction of exotic species and varieties, their systematic study and classifiication with regard to their inherent useful characters, as an important preliminary step in any crop breeding programme. Some of the exotic species and varieties may be highly useful in contributing "the genes" for resistance to diseases and pests and it is very evident that the plant breeder is able to produce varieties to suit multitudes of purpose, when only he has comprehensive collections which represent the most complete assortment of the characters found in the plants concerned.

Building up of a collection of varieties, forms, types, eco-types and races of a particular species of crop is a great necessity for a breeder as only from such a varying plant material he will be in a position to select the suitable improved type for the purpose intended. In most of the cultivated crops which have been very early introductions and which have stayed on as agricultural crops, a good number of strains have been evolved by the application of the principles of pure-line selection to naturally varying populations or to segregating progenies of inter-varietal crosses. Plant introduction will help to build up such a collection of varying types. With the greater scientific data available on the growth and developmental aspects of plant life, there will be greater scope for getting types with certain advantageous characters, by plant introduction.

The introduction of a particular type from another region with different temperature and length of day may result in the luxuriant growth of the vegetative parts and the suppression of the reproductive phase. In plants in which the vegetative growth and output are the primary considerations as in fodder grasses, fodder legumes, green manure plants, leafy vegetables, leaf and stem fibres, soil conservation plants, etc., there is scope for improvement by Plant Introduction. A couple of instances may serve as a pointer. In South India, we have the indigenous species of *Panicum antidotale* and *Brachiaria mutica* occurring wild. But these grasses as they occur in the wild conditions are not productive types to be of economic value. But the plants of *Panicum antidotale* raised from the seeds received from Australia are different in growth behaviour and have proved to be a good drought resistant grass not only for South Indian conditions but also for the other States. Similarly the type of *Brachiaria mutica* introduced from Ceylon has so much of vegetative growth, that the seed production is negligible, enhancing the nutritive value of the grass.

As shown above it is quite probable that a particular species or type, of a region though may not be having economic characterstics in that region, may have potentialities of advantageous utilisation in another country. As such the introduction of plants, their testing in gardens paying close attention and acclimatization of the promising ones will definitely add to the national wealth. And in fact, it is with this object in view the Commonwealth Agricultural Bureau, England has drawn attention to the recommendation of the Review Conference 1950 that all the research centres maintaining living collections of economic plant material should be invited "to give at least 12 months' notice of their intention to discard any of their material likely to be useful to member countries ".

Work of Plant Introduction in Madras: The Botany Section of the Agricultural Research Institute, Coimbatore has been serving as the Plant Introduction Centre for the State, in a very modest way. The introductions have been mostly on grasses and legumes. The section collaborates with the Plant Introduction Wing of the Indian Council of Agricultural Research at New Delhi. There is a great possibility of intensifying this item of work covering a larger number of other economic crops than those now dealt with. Rajasekhara Mudaliar (loc. cite) in his comprehensive treatment on this subject has stressed the importance of (1) the formation of an efficient Plant Introduction Bureau & (2) the Systematic Survey of the plant wealth of the country.

From a study of the Crop improvement steps taken in countries like United States of America, Australia, and European countries, phenomenal success had been achieved by Plant Introduction in the matter of food self-sufficiency, industrial raw plant material, fodders and soil conservation plants. With the much advantageous climatic conditions as available to us on the plains and on the different altitudes of the hills of Nilgiris, Madura and Yercaud and the slopes of the Western Ghats, the Plant Introduction work has great possibilites.

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Studies on the Headsmut of Sorghum

by

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Introduction: Sorghum forms one of the important food grains of the Madras state. It is grown over an area of 18 lakhs of acres. Several diseases are known to affect this crop. Of these the smuts are the most damaging. There are four kinds of smuts recorded on this crop in the Madras state. These are the grain smut, the loose smut, the long smut, and the head smut. The head smut is common in several districts in the state and in some years it has been observed to infect about five per cent of the crop in parts of Coimbatore and Salem districts. The entire ear head is transformed into a sorus which is covered by a thin whitish membrane in the early stage. Sooner or later the membrane is ruptured and a black mass of spores mixed with numerous fibres is exposed. The occurrence of this smut has been found to be greater in rainfed crops than in irrigated crop.

This smut has been recorded from America, Africa, and India. The causal fungus has undergone several changes in its nomenclature and is at present called *Sphacelotheca reiliana* Clint. The germination of the spores and the mode of infection of the smut have been studied by Potter (1914). He established that the smut is soil-borne. Kulkarni (1918) working in this disease in India was not able to observe the germination of the spores. He has stated that the disease was not seed-borne and he could not get infection when the seeds were mixed with the spores before sowing. In order to determine the maximum period during which the spores remain viable and also to find out how long the spores can survive in the soil, studies were undertaken and the results are communicated in this paper.

Materials and Methods: The spores were collected from fresh material, dried under shade for 48 hours and stored in envelops made of butter paper. The germination of the spores was tested by floating the spores on drops of tap water on slides kept inside Petri-dishes lined with moist filter paper. Germination counts were made after 24 hours. The plants were grown in glazed pots of uniform size with 11 inches diameter. The soil used was always sterilised before mixing the spores. The variety of Sorghum used was Co. 5 throughout the experiment as this was susceptible and of

short duration and was not season bound. The plants were examined in the boot leaf stage and the diseased ones were carefully removed without allowing the spores to fall on the soil in the pot. In the experiments where successive crops were raised in the same pots an interval of one week was allowed between the harvest of one crop and sowing of the succeeding one.

Experimental results: Viability of the spores: The germination of the spores collected and stored in the laboratory was tested at monthly intervals for over one year. The results are tabulated below. The material was collected on 8th September 1949 and germination counts were continued for one year.

TABLE 1.

Germination tests at monthly intervals

Date of testing	Percentage of germination	Date of testing	Percentage of germination
8—9—1949	0·8	8—3—1950	0·3
8–10—1949	0·9	8—4—1950	0·5
8–11—1949	1·6	8—5—1950	0·2
8–12—1949	1·8	8—6—1950	...
8—1—1950	1·2	8—7—1950	0·2
8—2—1950	0·6	8—8—1950	...

(Average counts of over three thousand spores were made in each case)

The results indicate that the spores under laboratory conditions remain viable for over ten months. However the germination is limited and the maximum obtained at any time was less than two per cent.

Infection studies: The soil in pots up to a depth of two inches was thoroughly mixed with the spores of the smut and the seeds of Sorghum were sown at the rate of ten seeds per pot. The plants grew up normally. When the ears were formed it was observed that six per cent of the plants were smutted while the rest were free. In the control pots where no spores were added there was no incidence of smut. The results indicated that infection takes place through the spores present in the soil.

In order to find out the effect of the spore load on the intensity of infection, the soil was mixed with weighed quantities of

spores and three levels of sporeload were used. The quantities of spores used per pot were 2 gm. 4 gm. or 8 gm. respectively. The spores were mixed with the top three inches of soil and the seeds were sown immediately. The experiment was carried out in two seasons and the results of infection are given below :—

TABLE 2

Spore Load and Infection

Date of sowing	Date of harvest	2 gm.		4 gm.		8 gm.	
		No. of plants present	No. in-fected	No. of plants present	No. in-fected	No. of plants present	No. in-fected
16—6—1949	8-10—1949	59	3	59	14	58	12
17-10—1949	22—1—1950	54	3	58	19	55	9

Higher infection was evident where the spore load was raised to 4 gm. per pot but there was no improvement in the intensity of infection with still higher spore loads. Four grams per pot appeared to be the optimum spore load.

Survival of the fungus: The duration of time during which the soil once mixed with the spores remains infective was next determined. The soil in the pot was mixed with four grams of spores per pot. Later, seeds were sown. When the ears were formed the crop was harvested. After a lapse of a week fresh sowings were made in the same pots. Thus successive crops were raised to find out the length of time the soil remained infective. The results are recorded below :—

TABLE 3.

Survival of the fungus in the soil

The soil was inoculated on 16—6—1949.

Date of sowing	Date of harvest	No. of plants present	No. infected
16—6—1949	10-10—1949	60	4
17-10—1949	9—2—1950	59	18
16—2—1950	6—6—1950	60	3
15—6—1950	3-10—1950	59	—
10-10—1950	7—2—1951	60	—
15—2—1951	11—6—1951	60	—

The controls were all healthy. The maximum infection was obtained in the second crop i. e., four months after the initial inoculation of the soil. The fungus does not appear to survive in the soil beyond one year.

In another series of experiment the pots were all inoculated with the same spore load on 10th September 1949. The inoculated pots were kept in the open in the potculture house. Sowings were made in different sets of pots at monthly intervals to find out how long the spores remain viable in the soil when no crop is raised in pot. The results obtained are given below:—

TABLE 4.

Time of sowing and intensity of infection

Date of sowing	No. of plants present	No. infected
10—9—1949	97	7
10-10—1949	97	9
10-11—1949	100	8
10-12—1949	97	11
10—1—1950	100	17
10—2—1950	96	8
10—3—1950	98	6
10—4—1950	96	2
10—5—1950	99	—
10—6—1950	100	—
10—7—1950	97	—
10—8—1950	100	—

It is seen from the results that sowings after eight months are not affected by the smut.

Discussion: These studies have revealed that the spores do not freely germinate. The percentage of germination is very low but takes place even when the spores are fresh.

The improvement with age is not very pronounced. Butler (1918) has stated that a few may germinate each time a rain falls but others will be still alive till the next crop is sown. Under laboratory conditions the spores retain their viability only for a year and all evidences go to show that the same may happen in the field

also. But this period is more than the interval between two crops. The fact that three successive crops were infected with one inoculation shows the capacity of the spores to retain their viability even under the conditions of cultivation. This smut is found to be on the increase in certain areas in Coimbatore district. The studies have shown that the intensity of infection increases with the increase of spore load up to a certain extent. The increase in the incidence of the disease should be attributed to successive showers of spores falling on the soil from infected plants in each cropping season.

The only two courses open for the control of this disease which exhibits soil-borne infection are the eradication of the smutted ears in order to prevent the increase of the spore load in the soil or to cultivate resistant varieties of Sorghum. The variety 'Milo' is reported to be resistant. Further tests with the different varieties of Sorghum available in our state are necessary to find out suitable resistant strains. Co. 5 is susceptible. Till such time when resistant varieties are available it is necessary to concentrate on the eradication of smutted ears as the main method of control.

I am highly indebted to Sri T. S. Ramakrishnan for his valuable guidance in carrying out these experiments. I am also thankful to Sri M. Kandaswamy, Government Mycologist, in charge, for his helpful criticisms in the preparation of this paper.

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Research Notes.

Influence of Boron on Potato Yields

Certain minor elements like chlorine, magnesium, iron, manganese, boron etc., are reported to influence crop yields, when supplied in limited amounts.

Reports on the effects of boron on the yield of potatoes are conflicting. While Smith and Nash (4), working on sand cultures, found that lack of boron resulted in adverse yields, Wallace (5) has reported that application as borax, at 20 lb. per acre, induced toxicity. No effects of addition of borax were evident on the Cumberland Plateau of Tennessee from the work of Ora Smith (3), though Dunkley and Midgley (1) discovered a marked response in boron deficient podzol top soils. Eaton (2) found that nutrient solutions containing one p. p. m. of boron gave increased yields of tubers.

This note reports the trials conducted at the Agricultural Research Station, Nanjanad, to study the effects of boron, applied as borax mixed with the Nanjanad mixture at planting.

Five treatments were provided in the above replicated trials, consisting of No Borax, (Control) and borax at 5, 10, 20 and 30 lb. per acre, and these were carried over ten crop seasons as follows:

1947	*1948*	*1949*	*1950*
1. Main crop	3. Irrigated crop	6. Irrigated crop	9. Irrigated crop
2. Second crop	4. Main crop	7. Main crop	10. Main crop
	5. Second crop	8. Second crop	

Treatment differences for yields were significant only in the seasons (1), (3), (5) and (9) above but, even in these four cases the results were not conclusive, since in no case did the application of borax give significantly higher yields over 'Control'. Even in regard to the four different levels of borax applied, there was no consistent relationship between these levels and the yields for the various seasons. In general, the effects of borax were not clear, nor did its applications prove useful.

The results recorded have been extracted from the Annual Station Reports of the Agricultural Department, relate to the period 1947 - '50, and form the work of the staff who were engaged in the studies. This is gratefully acknowledged.

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Agrl. Research Station, Nanjanad.

M. D. AZARIAH and K. SAPTHARISHI.

Influence of seed weight on the yeild of Elephant Yam (*Amorphophallus companulatus*)

Introduction: In the cultivation of crops, other factors being equal, the seed weight has been found to remarkably influence the yield. In paddy the heavy and well filled seeds of the short duration types are found to be better yielding than light and partially filled seeds. The influence of seed weight upon yield is, perhaps, more spectacular in the case of tuber crops. Work done at the Nanjanad Agricultural Research Station has shown that yield in potato increased considerably with increase in the seed weight.

Previous Work: References have been made by many to the cultivation aspect of yam but little or no work appears to have been done on the effect of seed weight upon the yield in this. In order to find out if the experimental observations recorded in the other tuber crops applied equally well to yam and if so, to find out the optimum economic size of seed to be used for planting the present experiment was taken up for trial.

Materials and Methods: Whole yams were cut to obtain seed material of ½ lb., 1 lb., 1½ lb. and 2 lb. bits taking care to see that each one of these contained a portion of the central core, the formative region giving rise to the vegetative buds. These were planted in May 1951 in randomised replications. The crop received the normal cultural operations and was harvested after two years and the yield recorded.

During the growth of yam in the above experiment it was observed that plants with a heavier seed weight were distinctly more vigourous in growth than those from the lighter seeds. In order to find out whether there existed any correlation between the vegatative growth and the weight of seed planted, height and girth measurements in the above experiment were recorded after six months from planting.

Results: The summary of results for yield and growth development are presented in tables I and II below.

TABLE I.
Seed weight and yield of plants

Particulars of treatment	Seed Weights: ½ lb. (control)	1 lb.	1½ lb.	2 lb.	General mean	S. E.	'Z' test satisfied or not	C. D. (P = 0.05)
Acre yield in lb.	5040	6720	9280	11,440	8120	872·9	Yes	1859·5
% on control	100·0	133·3	184·1	227	161·1	17·32		35·91

Conclusion: $\overline{1 \quad 2}$ 3 4

TABLE II.
Seed weight and growth of plant

Treatments (weight of seed material planted)							
½ lb.		1 lb.		1½ lb.		2 lb.	
Height	Girth	Height	Girth	Height	Girth	Height	Girth
11·5″	2·5″	13·6″	3·6″	16·3″	4″	18″	5″

The yield data on analysis are found to satisfy the 'Z' test. The highest seed weight, namely 2 lb. has recorded the maximum yield of 11,440 lb. per acre giving 127% significantly higher yield over ½ lb. seed weight (Control).

Growth data recorded in table II indicate a progressive increase in the shoot development with increase in seed weight.

Discussion: It will be seen from table I that there is a progressive increase in the yield of yam with the increase in the weight of the seed used for planting. Though the initial outlay may be slightly higher it is advantageous to use at least 1½ lb. seed for planting.

Planted on the same date and under similar conditions of plant growth it may be safe to correlate good yield with good shoot development. This might also help to postpone the harvest of a particular plant to the succeeding year in case its vegetative growth is comparatively poor.

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Agricultural Research Station, Pattambi.

P. UTTAMAN,
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The Manganese Content of Madras Soils

Introduction: Manganese is one of the Trace or Minor elements essential for good crop production. The element appears to be related to chlorophyll formation and hence to carbon assismilation and photo synthesis. It has an important role in the assismilation of nitrogen by plants and its translocation within them. In animal nutrition manganese is an essential part of many enzymes and has a significant bearing on the process of assimilation.

Most crops and plants require manganese for best growth. But the quantity required is small and under normal conditions many soils are able to supply this quantity. So the importance of the element in plant nutrition often escapes notice. But under alkaline conditions and with heavy application of lime to correct acidity, soils are not able to provide even the very small amount of the available nutrient required and plants suffer from various chlorotic and other diseases. In acid soils, on the other hand, manganese becomes readily available and the excess absorbed leads to various disorders.

Manganese in the right proportion is therefore very important in crop husbandry. Very little is known about the manganese status of Madras soils. In the present note data for the total manganese in the soils and sub-soils of the different climatic zones of the state as represented by the Agricultural Research stations, are given. The soil prepared in the laboratory and passed through the 2 mm. sieve is used for the estimation. The procedure may not be alright for exchangeable manganese as shown by Boken (1952) but is statisfactory for total manganese. The element is extracted from the soil by digestion with sodium sulphite in 2-4 normal sulphuric acid and oxidised to Permanganate with sodium bismuthate in the presence of mercuric oxide. The Permanganate obtained in this way is estimated in a Spekker Absorptiometer using spectrum filter 602 blue. The clour of the permanganate should be read off as quickly as possible, preferably within one hour of its formation. Where the colour of Permanganate is very light, 4-4′ tetra methyl diamino triphenyl methane may be used to intensify the colour.

Method for the Estimation of Total Manganese in Soils: 10 gm. of the air-dry soil are mixed intimately with 8-10 gm. of sodium sulphite and 100 cc. of 4N. sulphuric acid are added. The mixture is boiled on a hot plate for half-an-hour with occasional stirring. It is then quantitatively transferred to a 250 cc. flask and made up to the mark. After mixing thoroughly it is filtered through a dry filter and 25 cc. of the clear filtrate are taken for the estimation of manganese. To the aliquot are added 15 cc. of 4N. sulphuric acid, 2 gm. of mercuric oxide and 0 5 gm. of sodium bismuthate and the whole is boiled on a hot plate for about 15 minutes.

A further quantity of 0·5 gm. of sodium bismuthate is added and boiled again to ensure the complete exidation of the manganese. The solution is then filtered off and the residue washed to remove all traces of permanganate. The filterate and washings are collected in a 100 cc. measuring flask and made up to the mark. After mixing thoroughly the depth of the permanganate colour is measured in a Spekker Absorptiometer using Spectrum filter No. 602-blue.

A standard curve is prepared for manganese by taking known amounts of the element and obtaining the corresponding absorptiometer readings after oxidation to permanganate as indicated above. The curve is drawn with the absorptiometer reading and the corresponding amounts of manganese on the two axes. For the preparation of the standard 0·2878 gm. of pure dry potassium permanganate is dissolved in about 250 cc. of water. 20 cc. of strong sulphuric acid are added to the solution and the permanganate reduced to manganous salt by the careful addition of sodium metabisulphite in small quantities. The excess of the reducing agent is removed by the addition of a small amount of nitric acid. After cooling the solution is made up to 1 litre. Each cc. of the solution contains 0·1 mgm. of manganese. Different volumes of the solution are used for preparing the standard curve. The standard curve obtained is a straight line. With it the permanganate present in soils can be directly read off from the absorptiometer readings.

The Manganese Content of Madras Soils: The following table gives the manganese present in the typical soils of Madras.

No.	Soils, Locality and Depth			Total Manganese Milligrams per 100 gm. of air dry soil
1.	Black soil, Koilpatti	0-12"	...	99·54
2.	,, ,,	12-24"	...	101·4
3.	,, ,,	24-36"	...	98·93
4.	,, Madurai—(Paddy land)	0-12"	...	40·44
5.	Paddy soil (Wet land) Coimbatore	0-9"	...	51·12
6.	,,	9-18"	...	49·79
7.	Red soil Koilpatti	0-9"	...	72·78
8.	,, ,,	9-18"	...	57·49
9.	,, Coimbatore	0-9"	...	31·11
10.	,, ,,	9-18"	...	31·11
11.	Alluvium Pattukottai	0-9"	...	25·51
12.	,, ,,	9-18"	...	54 30
13.	,, Aduthurai	0-12"	...	83·33
14.	,, ,,	12-24"	...	91·24
15.	Sandy loam, Palur	0-6"	...	40·44

No.	Soils, Locality and Depth			Total Manganese Milligrams per 100 gm. of air dry soil
16.	,, ,,	6-12"	...	57·88
17.	,, Tirurkuppam	0-9"	...	28 03
18.	,, ,,	9-18"	...	39·02
19.	Laterite soil Pattambi	0-9"	...	15·46
20.	,, ,,	9-18"	...	15 46
21.	,, Mangalore	0-9"	...	15·46

From the results it is seen that soils formed under semi-arid conditions such as the soils of Koilpatti, Coimbatore, Palur and Tirurkuppam contain much more manganese then the heavily leached soils of the West Coast (Pattambi and Mangalore). Even in the same locality soils which are cultivated under wet conditions (Paddy soils) contain much less manganese than those under garden cultivation. So the black soil of Koilpatti in all depths is richer in manganese than the black paddy soils of Madurai. The alluvial soils contain manganese in varying proportions depending upon the nature of the alluvium, the leaching to which it has been subjected and other factors. The alluvium of Pattukottai contains less manganese than that of Aduthurai. The manganese content of black and red soils differ considerably probably because of the parent material from which they are derived.

The surface soil generally contains slightly less manganese than the top soil. This is probably because of the leaching to which the surface soil is subject. Along with other salts manganese might have been washed away or carried to the lower depths. However, in the heavily leached laterite soils of the West Coast there is no difference in total manganes between the top soil and the subsoil. It is difficult to understand the higher mangenese content of the Koilpatti red soil as compared with the subsoil.

Summary: The manganese content of soils can be estimated by extraction with sodium bisulphite in the presence of 2 to 4N sulphuric acid and the oxidation of the clear extract in sulphuric acid medium with sodium bismuthate. Chlorides that may be present in the soil may be eliminated by the addition of mercuric oxide to the mixture. The permanganate produced by the oxidation of the manganese of the soil may be measured in the Spekker Absorptiometer using spectrum filter No. 602-blue. The manganese may be read off from a standard curve prepared for the element.

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OBITUARY

Sri M. P. Kunhikutty, Assistant Marketing Officer, (Retd.) passed away at his residence at Tellichery on March 31st 1955 at the age of 64.

He was one of the early pioneers in livestock work in Madras State and worked both in Coimbatore and Hosur. Later, in 1935 he was appointed as Assistant Marketing Officer, Madras and was put in charge of the work of survey and development of livestock products. He has to his credit a number of market surveys on a variety of livestock and livestock products, such as cattle, sheep and goats, eggs, milk, hides and skins and has done outstanding work in the grading of livestock products.

Possessed of a sincere and modest temperament, he was a cheerful and helpful worker and had many friends in the department and outside.

May his soul rest in peace.

GLEANINGS

Built in Geiger Counters: The lowly flea, caught up willy-nilly in the atomic age, had not come unprepared for survival. Water fleas (Cladocera), it seems, are able to detect gamma radiation and will hurriedly evacuate any area in which it is present. So far as can be determined by the University of Michigan workers who first noted the phenomenon, this is the first known instance of a living organism being able to detect radiation by sensory perception. We poor humans, of course, must resort to Geiger counters and the like.

(Chemical and Engineering News. 32, 2940, 1954) [A. M. K.]

Adjusting Lambing Period Reduces Strain on Ewes: The practice of obtaining two crops of lambs commonly followed by Shepherds has been found to be harmful. Ewes dropping lambs twice a year do not get a chance to develop fully nor will their lambs have good growth. The additional fodder requirements cannot be had through grazing alone. Apart from this, the Shepherd loses in other ways. Male lambs, not being of uniform size, fetch a lower price in the market. The wool clip, not being uniform also will be of a low value. The excessive strain on the ewes will make them fail to breed. Livestock experts therefore, recommend only one crop of lambs in a year. They advise that lambing should be so adjusted that it coincides with the time when the grazing is in plenty, which will mean less strain on the ewes. Lambing can also be adjusted to when the climate becomes more temperate. When once the favourable lambing season is decided on it will be easy to fix the mating season. (I. C. A. R. Farm News Release No, 35)

Pest Damage to Grain in Storage — Latest Methods for Complete Control: Research on methods of controlling insect pests on grain stored in large quantities for food or for seed point to simple chemical methods that assure an almost complete control of the pests. Insects, along with other pests, are responsible for causing losses amounting to about 25,00,000 tons of grain every year in this country. Measures adopted to save this grain from pest damage will go a long way in saving food for the nation. Entomologists recommend that the grain after harvest and before storing should be thoroughly dried because grain which is fully dried is not favourable to the breeding or growth of the insects. They also prescribe light fumigation with a fumigant like chlorosol. This is available in liquid form, but vapourises on exposure to air. The fumigation is done by covering the stored grain under an air-proof cloth and pouring the liquid in a shallow dish kept on the top of the grain. The liquid is applied at 4 lb. per 100 maunds of the grain. The grain is kept exposed to the fumes for 24 hours. Grain stored for seed should be dressed with 10 per cent D. D. T. dust at the rate of 2 ounces per 125 lb. of grain. Research at the Indian Agriculural Research Institute, New Delhi, has shown that such a treatment will not interfere with the germination of the grain.

(I. C. A. R. Farm News Release No. 36)

Ensuring Right Flavour in Papaya — Simple Precaution in Harvesting and Packing: The practice of plucking papaya fruits in an unripe condition and allowing them to ripen in storage is not a desirable practice. This results in the fruits losing in their favour and taste. The right time for plucking these fruits is when they have just developed some yellow spots. The fruits should be plucked with the hand and stored in a dry place, covered with a gunny bag or in straw. It is advisable that the fruits are kept in a single layer. To get fruits of a good quality and of uniform size, farmers should thin out the fruits on the tree in the early stages. At the most, 15 to 18 fruits should be retained on a tree. Carefully packed fruit will stand long journeys well and remain fresh. Ordinary Bamboo or cane baskets can be used, and a bedding of straw may be spread in the basket as

well as between layers of fruits. More than three layers in a basket are not advisable. Large-sized fruits should form the bottom layers. The basket may be covered with a gunny and stitched. (I. C. A. R. Farm News Release No. 38)

Rice Responds to Nitrogen — Ten to Hundred per cent Increase in Yield: An extensive series of experiments conducted by the Central Rice Research Institute, Cuttack, has shown that rice can give increased yields from 10 to 100 per cent with the application of nitrogen in one form or the other. It has been found that ammonium sulphate is the most satisfactory fertilizer for rice. It contains 20 per cent nitrogen and is immediately available to the plants. Experiments have also shown that on moderately fertile soils abut 100 to 200 pounds of ammonium sulphate is best. Beyond 200 lb. it is not economical.

(I. C. A. R. Farm News Release No. 39)

Checking Fruit Fly Damage — Destruction of Fallen Fruits: The heaping up of fallen fruits or those unfit for the market in a corner of the garden is a harmful practice. Such heaps attract fruit flies by the sweet smell coming out of the fruits. An infected fruit is a source of further spread of the pest. As such, all attacked or fallen fruits should be destroyed by burying them two feet deep and ramming soil over them. If this is not possible, all discarded fruits should be boiled in water for an hour before throwing them away. Picking also should be done clean. Under developed fruits or small fruits should not be left over on the trees. Spraying with diesel oil solution, consisting of one gallon diesel oil, one pound of soft soap and one gallon of water diluted eight times gives a very good control over mango flies. (I. C. A. R. Farm News Release No- 40)

Healthy Setts for Seed — Keeping Down Borer Damage: A careful examination of the cane used for preparing setts for planting, rejecting those with holes, is one simple way of checking the shoot borer which does a great deal of damage to the crop when it is growing up. The pest, at first, is seen feeding on sugarcane leaves, but later bores into the stem killing the central shoot in young sugarcane. In grown up cane, the pest bores holes out of which froth will ooze. Great havoc is caused to sugarcane when the pest attack is severe. When pest infection is high, light traps should be set up in the field. This will trap and kill adult borer. Giving two light earthings during the early stages of the crop and discontinuance of ratooning are other suggested methods to reduce pest damage.

(I. C. A. R. Farm News Release No. 42)

IN LIGHTER VEIN

A Dairy wishing to advertise its product paraded through the town a stunt artist from the local circus under the banner. "This dare devil drinks our milk" The rival Dairy without incurring any expenditure simply parraded a placard with the inscription "You dont have to be a daredevil to drink our milk".

Weather Review — For the month of March, 1955.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January	Division	Station	Total for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam)	0·0	— 0 3	4·6	South	Madurai	0·6	— 0·1	0·9
	Tirurkuppam*	0·0	— 0·2	4·9		Pamban	0·2	— 0·5	6·1
	Vellore	0·0	— 0·3	1·8		Koilpatti*	2·5	+ 1·2	5·1
	Gudiyatham*	0·0	— 0·3	1·8		Palayamcottai	0·3	— 0·7	2·2
						Ambasamudram*	1·4	— 1·5	6·3
East Coast	Palur*	0·0	— 0·5	2·6	West Coast	Trivandrum	2·1	+ 0·6	2·9
	Tindivanam*	0·0	— 0 7	0·5		Fort Cochin	0·7	— 1·3	1·7
	Cuddalore	0·0	— 0·7	1·9		Pattambi*	0·1	— 0·8	0·1
	Nagapattinam	Tr.	— 0 8	3·5		Kozhikode	0·5	+ 0·1	0·9
	Aduturai*	0·0	— 0·6	1·5		Taliparamba*	0·4	+ 0·1	0·4
	Pattukottai*	0·0	— 1·2	3·2		Wynaad*	3·6	+ 0·6	3·6
						Nileshwar*	0·2	— 0·2	0·2
						Pilicode*	0·0	— 0·4	0·0
Central	Salem	1·3	+ 0·8	1·4		Mangalore	Tr.	— 0·5	Tr.
	Coimbatore (A. M. O.)*	0·0	— 0·3	0·3		Kankanady*	0·0	— 0·5	0·0
	Coimbatore	0·0	— 0·5	0·6	Hills	Kodaikanal	1·9	+ 0·1	4·3
	Tiruchirapalli	Tr.	— 0·4	1·0		Coonoor*	2·0	— 1·5	6·9
						Ootacamund*	1·0	£	2·0
						Nanjanad*	1·0	— 0·1	1·7

Note :—1. * Meteorological Stations of the Madras Agric. Dept.
2. Tr. = Trace (0·01″ to 0·04″)
4. £ = Actual deviation is 0·01″.

The month began with a marked upper air discontinuity at 3,000 ft. above sea level over Tiruchirapalli. The weather was practically dry during the first three days. On 4—3—1955 thundershowers occurred at a number of places in interior Tamilnad. On the next day also a few localised showers were received in Tamilnad. In the succeeding two days weather was mainly dry. Again on 8—3—1955 thundershowers were received at a few places in South Tamilnad. Travancore-Cochin received a few localised showers on the next day. From 10—3—1955 to 22—3—1955 the weather was practically dry throughout the State with mild variations in the day and night temperatures. For a week from 23—3—1955 thundershowers were received in some portion or other of the Madras State or Travancore-Cochin or Mysore area. Majority of the showers received during this period happened to be highly localised in nature. The weather was mainly dry in the last two days of the month.

In short, the rainfall in March 1955 remained practically sub-normal throughout the States barring a few solitary exceptions. Consequently the summer conditions were felt as severe practically throughout the State. Water table is going low and scarcity for even drinking water is felt in some taluks of dry districts.

The note-worthy rainfalls and the zonal rainfall in inches are furnished hereunder:

Note-worthy Rainfalls			Zonal Rainfall			
Date	Name of Place	Rain-fall	Name of Zone	Av. rainfall for Dec.	Dep. from normal	Remarks
4/3/55	Salem	1·3	North	0·0	— 0·3	Below normal
8/3/55	Tuticorin	1·8	East Coast	0·0	— 0·8	do.
25/3/55	Alleppey	3·0	Central	0·3	— 0·1	do.
25/3/55	Kodaikanal	1·0	South	1·0	— 0·3	do.
27/3/55	Trivandrum	1·0	West Coast	0·8	— 0·2	do.
			Hills	1·5	— 0·4	do.

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 7—4—1955.

C. B. M. & M. V. J.

DEPARTMENTAL NOTIFICATIONS

Gazetted Service — Postings and Transfers

Names and Present post	Posted as
Albuquerque, S. D. S., Asst. in Oil Seeds,	Supdt. A. R. S., Nileshwar.
Ananda Padmanabha Pillai, Principal, G. S. T. Centre,, (Basic) Bhavanisagar,	Principal, G. S. T. Centre., (Extension), Bhavanisagar.
Appaji, V. K., D. A. O., Vellore,	Gazetted Asst. to D. A., Madras.
Francis, T. S., Regional Dy. Director of Argriculture, Madurai,	Asst. Marketing Officer, Coimbatore.
Krishnamurthy, R., A. C. S., Coimbatore,	Asst. Cotton Extension Officer, Coimbatore.

Name and present post	Posted as
Kannian, K., Asst. Cotton Specialist, Coimbatore,	Addl. Supdt. C. F., Coimbatore.
Natarajan, T., Gazetted Asst. to D. A., Madras,	Administrative Officer, Agricultural College, Coimbatore.
Narayan Nair, K., (On leave)	Secretary, Coimbatore Market Committee.
Parthasarathy, S. V., Sugarcane Agronomist, Gudiyattam,	Sugarcane Specialist, Palur.
Rajagopalan, N. S., D. A. O., Tirunelvelly,	D. A. O., Vellore.
Ramachandran, S. V., D. A. O., Vellore,	Asst. Marketing Officer, Madras.
Santhanakrishnan, B., Asst. Marketing Officer, Madras,	D. A. O., Tirunelvelly.
Thirumalacharya, N. C., (D. A. O., On leave)	Spl. D. A. O., Crop Sampling, Vellore.

Upper Subordinates — Postings and Transfers

Names and Present post	Posted as
Anantaraman, P. V., Asst. in Paddy, Coimbatore,	Asst. in Chemistry, Coimbatore.
Anantachari, P. S., A. D., Perungathur,	P. A., to D. A. O., Vellore.
Adyanthayya, Mycology Asst. Vittal,	Mycology Asst. Coimbatore.
Abdul Lateef, A. D., Rajapalayam,	A. D., M. Reddiarpatty.
Athmarama Iyer, P. S., Marketing Asst. Tanjore,	S. D. A., Pattukottai.
Balasubramaniam, K. R., S. D. A., Tanjore,	A. D., T. Kallupatty, Madurai.
Balakrishnan, S., Paddy Asst. Pattambi,	F. M., Ambalavayil.
Chockalingam, M., A. D., Mannargudi,	A. D., Needamangalam.
Chockalingam, C. D., Extension Officer, Kadambathur,	A. D., Saidapet.
George, A., A. D., Needamangalam,	A. D., Mannargudi.
Ganapathy, K. V.,	A. D., Karipatty, Salem.
Gopalakrishnan, P. K., F. M., Ambalavayil,	Asst. Vegetables, Coimbatore.
Krishnamurthy, P. S., A. D., Uthukottai,	A. D., Vegetables, Madras.

Name and present post	Posted as
Kandaswami, T. K., Asst. in Myco., Coimbatore,	Spl. A. D., Sugarcane, Karur.
Krishnan, R. H., (On leave)	Asst. in Paddy, Aduthurai.
Lakshmi Ramakrishnan, Asst. in Myco., Coimbatore,	Asst. in Tuber Crops, Coimbatore.
Malathi Devi, Asst. in Chemistry, Coimbatore,	Res. Asst. Storage and Fruits, Coimbatore.
Meenakshi Sundaram, D., Asst. in Botany, Coimbatore,	Asst. in Plant Physiology, Coimbatore.
Narayanan, A., S. D. A., Pattukottai,	Cotton Asst. Periakulam.
Paramanandam, P., A. D,, Namakkal,	Spl. A. D., Vellore.
Pranatharthiharan, A. D., Hosur,	F. M., Live Stock, Orthanad.
Ramanujam, K., Asst. in Paddy, Coimbatore,	Cotton Asst. Coimbatore.
Rajagopalan, K., Paddy Asst. Aduthurai,	Paddy Asst. Coimbatore.
Subramaniam, K. P., A. D., Vegetables, Madras,	Extension Officer, Kadambathur.
Sowmini Rajagopalan, Asst. in Myco., Aduthurai,	Asst. in Myco., Coimbatore.
Seshadri, V. S., Asst. in Tuber Crops, Coimbatore,	Asst. in Fruits, Aduthurai.
Somasundaram, K., A. D., M. Reddiarpatty,	A. D., Virudhunagar.
Sivaraman, S. S., Spl. A. D., Coimbatore,	Plant Protection Asst. Pattukottai.
Thulasi das, G., Ginger Asst. Pattambi,	Ginger Asst. Ambalavayil.
Venkataraman, S., D. A. O., (On reversion),	S. D. A., Tanjore.
Viswanathan, P. S., Asst. in Plant Physiology, Coimbatore,	Paddy Asst. Pattambi.
Venugopal, K. P. P. A., Pattukottai,	Spl. A. D., Sugarcane, Coimbatore.

DISTRICTS
S. ARCOT; COIMBATORE
MALABAR; S KANARA
RAMANATHAPURAM,
TIRUNELVELI
NORTH ARCOT

MARKET COMMITTEES CHRONICLE
DEVOTED TO A FACTUAL RECORD OF SERVICE FOR REGULATED MARKETING

CROPS
COTTON, GINGELLY
GROUNDNUT
COCONUT
ARECANUT
TOBACCO

Arecanut (*Areca Catechu*) in South Kanara — a few broad aspects of its quality

by

K. TEJAPPA SHETTY,
Secretary, South Kanara Market Committee, Mangalore

Arecanut (Betelnut) being essentially a cross fertilised palm, it is but natural that a number of types varying mainly in shape, size and colour of nuts are met with in the same area. Yet it is seen that regional variations in types are mostly maintained because no large scale attempts have ever been made to replace the existing types by any well-planned selection work. The types of arecanuts grown in the Malnad areas like Mundaje of this district are of a smaller type than those grown in Badiaka centre of Kasaragod taluk. The produce of North Malabar which is brought to Mangalore market is generally found to be much inferior to the produce of South Kanara mainly because of the smaller type of nuts grown there. It is therefore seen that the data regarding various aspects of this crop differ widely not only between different regions but also within different gardens in the same region and even between trees in the same garden.

The following data are the result of the enquiries conducted by the author and are also based on the data collected at the Arecanut Research Station, Vittal. They give fair idea of the variations found in this crop in a normal year:

	Minimum	Maximum	Average
1. Total No. of trees in a garden ...	500	1200	650
2. Total No. of bearing trees in a garden ...	300	650	400

		Minimum	Maximum	Average
3.	Total No. of bunches per palm ...	1	6	2·4
4.	Total No. of nuts per bunch ...	30	400	95
5.	Total No. of nuts per tree ...	—	—	210
6.	Total No. of ripe arecanuts (raw) per pound ...	10	25	14
7.	Total No. of dry arecanuts (with husk) per pound ...	30	80	35
8.	Total No. of cured and husked nuts per pound ...	52	110	60
9.	Percentage of husked nuts to the total dry unhusked nuts ...	—	—	60
10.	Percentage of husk to dry unhusked nut ...	—	—	40
11.	Yield by the number of nuts per acre ...	30,000	2,00,000	78,000
12.	Yield of "Gotu" (sundried whole husked nuts) per acre ...	280 lb.	3360 lb.	1250 lb.

Note: The "Gotu" is separated into "Biligotu" that is superior white nuts — 96·5% and "Koka", that is inferior dark nuts — 3·5% before sending the same to the market.

13.	Price of "Biligotu" per cwt.	Rs. 128	Rs. 148	Rs. 140

From the above data it may be seen that there is a wide variation not only in the yield of the individual trees and gardens but also in the market prices of the commodity depending upon the locality where it is grown and the type of nuts. There is thus large scope for the improvement of this crop to increase both the yield and quality of nuts. Though the "Chali" (sundried whole nuts) type of nuts of South Kanara are found to be superior to the nuts of any other area, there is still further scope to improve the quality to get uniformly good nuts which may help largely in fetching the fair average price, reducing the wide range of variations in prices as seen at present. Very useful basic data on this crop are being collected at present at the Arecanut Research Station at Vittal and it is hoped that the Central Arecanut Research Station will try to tackle most of these problems when it starts its work.

Note on the Market Conditions on the Notified Commercial Crops During March 1955

I. **Groundnut**: *South Arcot Market Committee:* Arrivals of groundnut kernels in all the eight regulated markets amounted to 2,736 tons during the month. Tindivanam, Vridhachalam and Tirukoilur markets registered the largest arrivals in the order indicated. Prices of groundnut kernels opened at Rs. 97—2—0 per candy (531 lb.), improved gradually to Rs. 98—10—0 in the middle of the month and closed lower at Rs. 96—8—0. Local crushers were the main buyers and the export demand for oil was reported to be restricted.

North Arcot Market Committee: Arrivals of groundnut kernels into the regulated markets of North Arcot Market Committee were only 56 bags of 177 lb. each or 4 5 tons nearly. The prices of groundnut kernels in North Arcot district ruled around Rs. 89—9—0 per candy of 531 lb.

II. **Gingelly:** The arrivals of gingelly were confined to only the five markets of South Arcot district (i. e.) Vridhachalam, Tirukoilur, Cuddalore O. T., Villupuram and Tindivanam and amounted to 1,758 bags of two maunds (82-2/7 lb.) each during the month. The prices of Gingelly which opened at Rs. 36—1—0, per bag of 2 maunds each, improved to Rs. 41—9—0 and later receded to Rs. 35—5—0, a level lower than the opening rates.

III. **Cotton:** The arrivals of cotton to Tiruppur market were as furnished below:

Lint 245 candies (each 784 lb.)
Kappas 26,841 pothis (each 280 lb.)

Prices of Cambodia and Karunganni Cotton, both lint and kappas ruled at rates given below at a few important market centres in the notified areas.

(Amount in Rs. Quantity: Lint per candy of 784 lb. Kapas per pothi of 280 lb.)

Markets	Cambodia Lint	Cambodia Kapas	Karunganni Lint	Karunganni Kapas
Tirupur	861—891	100—106/8	700	79/80
	Uganda Certified	Uganda Uncertified		
Kovilpatti	1100—1150	950—980	720	92/10
Virudunagar	1126	1087	691—720	77/3—81/6

IV. **Coconut:** The coconut market in Malabar opened with a carryover of 6,261 thousand nuts and accounted for 8,482 thousands nuts

under new arrivals. Disposals (both as local sales and despatches) amounted to 9,042 thousand nuts leaving a closing stock of 701 thousand nuts. The demand for North Indian Markets was encouraging throughout the month.

In addition to an opening balance of 2,000 candies (700 lb each) of copra heavy arrivals were received amounting to 3,690 candies during the month. Of the above 3,075 candies were disposed of leaving a carry over of 2,615 candies. There was good demand from local millers for milling copra.

Prices of coconuts in Malabar markets ranged from Rs. 115-130 per thousand nuts during the month. Copra rates stood at Rs. 260—280 per candy for Office variety Rs. 270—280 for Edible variety and Rs. 360—375 for Madras variety and Rs. 400-425 far Rajpur variety.

Prices of coconut in South Kanara district ranged from Rs. 150—160 for raw moist nuts and Rs. 170—195 for dry nuts per thousand and for copra, rates ruled at Rs. 270—290 per candy of 660 lb.

V. **Arecanut:** Arrivals were meagre in Malabar being off season while they were heavy in Mangalore. Estimated arrivals and disposals both in Malabar and South Kanara districts were as follows :—

	Opening balance.	Receipts.	Despatches.	Local sales.	Closing balance.
Malabar (in bags of 100 lb) each ..	695	300	292	50	653
South Kanara (in cwts) ..	9,101	39,000	37,481	..	10,628

The prices of Arecanut both in Malabar and South Kanara Districts were as follaws :—

		Opening.	Closing.
(South Kanara Dist.)		Rs.	Rs.
Koka	..	65—105	95—115
Choll	..	No Stock.	No Stock.
Malabar Supari	..	115—130	130—145
Mangalore Supari	..	128—148	140—170
(Malabar Dist.)			
Choor	..	..	170—190

IV. **Tobacco:** It is estimated that the size of tobacco crop in 1954—55 in Coimbatore district will be about 40,0000 candies and the quality of the new crop is also expected to be satisfactory. The total despatches of chewing varieties amounted to 805 candies and the destinations were Palghat, Vellore, Tirupattoor, Madras, Quilon and Madurai. The available stocks consisted of only chewing tobacco and is put at

8418 candies in Coimbatore district. The prices indicated a sagging tendancy. The prices of Tobacco of various grades were as given below:—

Price per candy of 500 lb.		Chewing Varitios. Meenampalayam.	Palladam.
		Rs.	Rs.
I quality	..	450—500	200—220
II quality	..	300—400	120—150
III quality	..	200—280	80—95

Activities of the Market Committees during the month of March 1955.

I. Five of the Seven Market Committees in the districts of North Arcot, South Arcot, Coimbatore, Malabar and South Kanara were functioning normally while the stalemate in the Committees of Ramanathapuram and Tirunelveli districts continued to prevail due to certain legal difficulties. Government have sanctioned the opening of two markets by the Malabar Market Committee, one at Thalakkadathur (for coconuts and arecanuts) and the other at Kuttipuram (for cured arecanut) with provision for refusal of licences or renewal of old licences for the purchase and sale of the respective commodities within a radius of 5 miles from the limits of the above markets.

The following progress was made by the market committees during the month in the issue of licenses under Section 5 of the Madras Commercial Crops Markets Act.

Committees	*Sec. 5(1)* A	B	*Sec. 5(3)* A	B	*Weighmen* A	B	*Broker* A	B
North Arcot Market Committee	144	542	53	262	43	228	2	7
South Arcot Market Committee	161	846	184	992	67	402	1	2
Tirunelveli Market Committee	...	36	...	15	...	17	...	...
Coimbatore Market Committee								
South Kanara Market Committee	37	134	22	113	4	18	...	5
Malabar Market Committee	8	86	52	180	5	132	...	9

A :— During the month
B :— Upto the end of the month

The total of transactions in commercial crops in all the regulated markets in the State, during March, 1955 is as follows:—

Crop	*Quantity*	*No. of Regulated Markets*
Groundnut kernels	2673 5 Tons	10
Gingelly	1288 bags*	5
Cotton Lint	912 candies**	1
,, Kapas	26841 Pothies***	1

* One bag = 2 Indian Standard Maund
** One candy = 784 lb.
*** One pothi = 280 lb.

II. **Meetings**: One meeting each in the committees of North Arcot and Malabar districts were held besides a special sub committee meeting of Malabar Market Committee. The North Arcot Market Committee decided to request the Government to notify Jaggery and Chillies as Commercial crops in North Arcot District under Madras Commercial Crops Markets Act. The subjects tabled by other Market Committees were of routine nature. In the North Arcot Market Committee, the members appointed at the inception laid down their office at the end of the month and the Collector of North Arcot assumed the powers of the Committee as per Section 6-A of the Madras Commercial Crops Act, 1933.

III. **Special features**: During the month North Arcot Market Committee held a refresher course followed by an examination for the benefit of field staff dealing on the salient features of the provisions of the Madras Commercial Crops Markets Act, Madras Commercial Crops Markets Rules and the By-laws of the Committee.

IV. **Quality appraisal**: During the month a total of 608 samples of groundnut kernels were drawn from the arrivals into the five regulated markets of South Arcot Market Committee from 6,946 lots comprising of 2,505 tons and analysed for an objective study into the qualities of groundnut kernels.

[From The State Marketing Officer, Madras.]

MARKET NOTES AND PRICES

1. The range of *market prices* for the month of March 1955:—

For the week ending	Arecanut				Copra per candy of 660 lb.		Coconuts per 1000 nuts
	Koka Rs.	Choli Rs.	Malabar supari Rs.	Mangalore supari Rs.	Rs.		Rs.
3—3—1955	65 to 105	No stock	115 to 130	128 to 148	270 to 295	R. D.	150 to 170 170 to 230
10—3—1955	65 to 110	do.	115 to 132	130 to 152	260 to 280	R. D.	150 to 170 170 to 225
17—3—1955	75 to 115	do.	125 to 140	140 to 171	250 to 265	R. D.	140 to 165 195 to 200
24—3—1955	95 to 115	do.	125 to 140	140 to 165	250 to 260	R. D.	140 to 165 165 to 200
31—3—1955	95 to 115	do.	130 to 145	140 to 170	250 to 260	R. D.	140 to 160 160 to 195

R. = Raw. D. = Dry.

2. The estimated *stocks* held and exports ("SUPARI"):—

Opening Balance Cwt.	Receipts Cwt.	Exports Cwt.	Closing Balance Cwt.
9,109	39,000	37,481	10,628

The price of "Supari" improved steadily during the month by about Rs. 20/- per Cwt. and remained practically steady at this higher level during the latter half of the month, with good demand and large exports. Price of copra which showed an improvement during the previous month, declined by Rs. 35/- per candy during the month and remained steady at this lower level. There was sudden fall in the price of coconuts by over Rs. 40/- per 1000 nuts and the market continued to be weak.

Mangalore,
5—4—1955.

Secretary,
South Kanara Market Committee.

CROP AND TRADE REPORTS

Potato - First Forecast Report - 1954—'55 - Madras State: Potato is grown mainly in the Nilgiris district and to a small extent in the districts of Salem and Madurai. The area under the winter crop upto 25th December 1954 is estimated at 1350 acres as against 1100 acres estimated for the corresponding period of the last year, representing an increase of 22·7 per cent. The yield per acre is expected to be normal in the districts of Salem, Madurai and Nilgiris. The wholesale price of potato per maund of 82 2/7 lb. or 3200 tolas on 15—1—1955 was Rs. 13/- at Mettupalayam which is the same as that which prevailed during the corresponding period of last year.

Mesta - Second Forecast Report–1954—'55 - Madras State: Mesta (Habiscus Cannabinus) is grown in the districts of North Arcot, Coimbatore, Tiruchirapalli, Tanjore, Madurai and Tirunelveli and the area sown with the crop during 1954—'55 is estimated at 910 acres. Compared with the area of 620 acres estimated for the corresponding period of the previous year, this is an increase of 46·8 per cent,

An increase in area is estimated in the districts of North Arcot, Coimbatore. Tiruchirapalli, Madurai and Tirunelveli and the area is the same as that of the last year in the district of Tanjore. The seasonal factor for the State as a whole works out to 98 per cent of the normal as against 95 estimated for the previous year. On this basis, the total yield in term of dry fibre works out to 1,680 bales of 400 lb. as against 1,110 bales, estimated for the corresponding period of the previous year, representing an increase of 51·4 per cent.

Gingelly - Third Forecast Report - 1954—'55 - Madras State: The area sown with sesamum (gingelly) crop in the Madras State upto 25th December 1954 is estimated at 343,500 acres. Compared with the area of 346,000 acres estimated for the corresponding period of the previous year and the average area of 315,700 acres for the five years ending with 1953—'54, the present estimate reveals a decrease of 0 7 per cent and an increase of 8·8 per cent respectively. A decrease in area is estimated in the districts of Chingleput, Salem and Madurai and an increase in all the other districts except North Arcot, Tirunelveli and South Kanara where the area estimated is the same as that of the previous year. The variations are marked in the districts of Chingleput (−3,000 acres), Salem (−5,090 acres) and Coimbatore (+3000 acres). Gingelly is a negligible crop in the Nilgiris district. The main crop has been harvested. The yield per acre is expected to be normal in Salem and Tanjore districts and slightly below normal in all the other districts of the State. The condition facter for the State as a whole works out to 97% of the normal as against 95% in the corresponding report of the previous year. On this basis, the total yield is estimated at 43,600 tons. Compared with the yield of 43,200 tons estimated for the corresponding period of last year and the average yield of 35,800 tons for the five years ending with 1953—'54, the present estimate reveals an increase of 0·9 per cent and 21·8 per cent respectively. The average wholesale price of gingelly seed per standard maund of 82 2/7 lbs. as reported from important market centres on 8—1—1955 was Rs. 25—0—0 at Tirunelveli, Rs. 21—0—0 at Tiruchirapalli and Salem, Rs. 20—9—0 at Cuddalore and Rs. 20—0—0 at Tuticorin. Compared with the prices prevailed on 9—1—1954 these reveal a fall of 10·7% at Tirunelveli, 20·8% at Tiruchirapalli 23·1% at Cuddalore, 34·6% at Salem and 40·3% at Tuticorin.

Groundnut - Fourth or Final Forecast Report - 1954—'55 - Madras State: The area sown with groundnut in the Madras State upto December 1954 is estimated at 1,625,000 acres. Compared with the area of 1,444,700 acres according to the figures as per the Season and Crop Report for the previous year (provisional) the present estimate reveals an increase of 12·5 per cent. As compared with the average area of 1,783,300 acres calculated for the five years ended 1953—'54, the current year's estimate shows a decrease of 158,300 acres or 8·9 per cent. The area under the crop in South Kanara and the Nilgiris districts is negligible. A decrease in area is estimated in the districts of Chingleput and Tirunelveli districts and an increase in area in all the other districts of the State. The harvesting of winter or main crop is proceeding. The yield per acre is expected to be below normal in all the districts of the State. The Seasonal Factor for the State as a whole works out to 94 per cent of the normal as against 97 per cent estimated for the previous year. On this basis, the total yield in terms of unshelled nuts is estimated at 763,600 tons as against 697,700 tons for the previous year according to the provisional figures as per the Season and Crop Report, representing an increase of 9·4 per cent. The present estimate is also an increse of 5·8 per cent as compared with the average yield of 721,800 tons (unshelled nuts) calculated for the five years ended with 1953—'54. The wholesale price of groundnut (machine shelled) per standard maund of 82 2/7 lb. or 3200 tolas as reported from certain important markets centres on 8—1—1955 was Rs. 14—13—0 at Vellore, Rs. 14—15—0 at Erode,

Rs. 15—7—0 at Salem, Rs. 16—4—0 at Cuddalore and Rs. 17—0—0 at Coimbatore. Compared with the prices which prevailed during the corresponding period of the previous year, the current prices reveal a fall of 34·0 per cent at Cuddalore, 36·4 per cent at per cent at Coimbatore, 39·1 per cent at Vellore, 39·6 per cent at Salem and 41·3 per cent at Erode.

Cotton - Fourth forecast report - 1954—'55 - Madras State: The area sown with Cotton in the Madras State upto 25th January 1955 is estimated at 768,200 acres. Compared with the area of 755,300 acres estimated for the corresponding period of last year and an average area of 709,200 acres calculated for the five years ending 1953—'54, this is an increase of 1·7 per cent and 8·3 per cent respectively. The area estimated is the same as that of last year in the districts of Chingleput. North Arcot, Tiruchirapalli, and South Kanara. A decrease in area is estimated in the districts of South Arcot and Tanjore and an increase in the other districts of the State except in the Nilgiris district where the area under Cotton is little or negligible. Pickings of Cotton crop are in progress in the districts of Salem and Madurai. The crop is reported to have been affected by insect pest in the district of Coimbatore. The yield per acre is expected to be normal in the districts of South Arcot, Salem, Tanjore, Malabar and South Kanara and slightly below normal in the other districts of the State. The seasonal factor for the State as a whole works out to 96 per cent of the normal as in last year. It is, however, too early to estimate the yield with accuracy as the harvest has not commenced in the major portion of the area and much will depend upon the future weather conditions in the districts. The total yield works out to 252,600 bales of 392 lb. lint as against 244,400 bales of 392 lb. lint for the previous year and an average yield of 224,500 bales for the five years ending with 1953—'54, representing an increase of 3·4 per cent and 12·5 per cent respectively. The average wholesale price cotton lint per maund of 82 2/7 lb. or 3.200 tolas as reported from important market centres on 5th February 1955 was Rs. 97—1—0 for Coimbatore Cambodia, Rs. 83—15—0 for Coimbatore Karunganni and Rs. 70—14—0 for Tirunelvelies at Madurai compared with the prices during the corresponding period of the previous year, those prices show a fall of 11·8 per cent in the case of Tirunelvelies, at Madurai, 6·0 per cent in the case of Coimbatore Karunganni and 1·9 per cent in the case of Coimbatore Cambodia.

Redgram - Second Forecast Report 1954—'55 - Madras State: The area sown with Redgram in Madras State upto 25th December 1954 is estimated at 161,500 acres. Compared with area of 163,400 acres estimated for the corresponding period of last year, this is a decrease of 1·2 per cent. The crop is mainly grown in the districts of South Arcot, North Arcot, Salem, Coimbatore and Tiruchirapalli. A decrease in area is estimated in the districts of Coimbatore, Tanjore, Madurai and Tirunelveli and the area is the same as that of last year in the other districts except in North Arcot, Tiruchirapalli and South Kanara where an increase is estimated. The area under the crop in the Nilgiris district is little or negligible. The crop has been harvested in most of the districts. The yield per acre is expected to the normal in the districts of Tanjore and slightly below the normal in the other districts of the State. The Seasonal Factor for the State as a whole works out to 97 per cent of the normal which is the same as that for last year. On this basis the total yield works out to 23,400 tons of cleaned grain as against 23,000 tons of cleaned grain for the corresponding period of last year representing a decrease of 2·1 per cent. The average wholesale price of redgram dhall per maund of 82 2/7 lbs. or 3200 tolas on 8th January 1955 was Rs. 16—8—0 in Tirunelveli. Compared with the price which prevailed on 9—1—1954, this shows a decrease of 28 per cent.

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Editorial

At the tripartite labour conference held this month in Bombay, discussions were held to implement the provisions of the Minimum Wages Act of 1948 to farm labour. Minimum wages have been fixed for Industries and Plantations, where labour is well organised. But in the case of Farm Labour, it is well-known that they have always been in surplus, scattered and improperly organised and hence in a very weak bargaining position. Consequently, wages in agriculture have continued and still continue to compare unfavourabley with wages in most other industries and there is an apparent acceptance of this gap as a permanent characteristic of our economy. But it cannot be gainsaid that the agricultural labourer is also entitled to fair wages as much as his Industrial contemporary. However, the point at issue seems to be in the *Modes opurandi* of giving effect to the accepted minimum farm wages.

Due to the geographically scattered nature of Agricultural employment and the fact that work exists for only 189 days on an average in the year for farm labour, puts this category of labour entirely on a different footing from its counterpart in Industry. Mere implementation of the Act therefore, as rightly pointed out by the Ministers of Labour during the conference would be impossible. The Labour Minister of Hyderabad is reported to have said that attempts made to implement the Act in that State completely failed and added "that unless Agricultural Labour was properly organised and their holdings standardised and co-operative farms established the mere fixation of minimum wages would neither succeed in improving their lot nor solve the problem."

We are of the view that the absence of effective organisations and prevalence of low wages are the very conditions justifying State regulation of wages in this country. The English system may give a clue to a successful regulation. The Agricultural Wages Regulation Act of 1924 and the subsequent amendments introduced regulation of farm wages in England and Wales. The Act is reported to be working successfully and might therefore, give us some solution to the age old problem of minimum wages for agriculture in our country.

A Production Plan for Raw Cotton in the Madras (Undivided) State

by

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Introduction: During the first half of the nineteenth Century, the East India Company conducted extensive trials on the cultivation of American Cotton all over India, in order to develop the raw cotton resources of the colonies for feeding the textile industry of England. The results though disappointing opened the eyes of the then State Governments and indicated the desirability of taking up improvement work on the indigenous races in addition to acclimatisation of extra-Indian varieties of Cotton. The progress of cotton research in India has since then not only kept pace with the growth of mill industry but has also helped the country in forging herself to a very prominent place among the nations leading in textile manufacture. The textile industry of the Madras State owes a great deal to the fruits of cotton research done at Coimbatore and attached centres.

The position in regard to supply and distribution of cotton for the year 1952-'53 was estimated at 67,25,000 bales and 50,45,000 bales respectively with a carry over stock of 16,80,000 bales. The whole of the estimated Indian production of 36,65,000 bales less exports of short staple varieties, was consumed and the demands for the foreign cotton were in excess of the imports. The target for the cloth production fixed for the year 1956 by the Planning Commission was exceeded in the year 1953 itself. In spite of improved domestic supplies during the last few years, there is considerable shortage of raw cotton and India is obliged to import from East Africa, Egypt and other countries. Competition, exchange and price structure will exercise a great influence on the quantitative aspect of imports even if cotton was available from East Africa, Egypt, U. S. A., Brazil, Peru and Pakistan. It is therefore imperative that India which leads Japan and Britain in textile exports must produce more cotton if the present supremacy is to be maintained and if the stability and progress of the industry are to be assured.

In any national drive for self sufficiency or maximum production the gaps in supply have to be made up either through increase in yield per acre or through rise in planted area. The programme should consist of short and long term policies, the former

getting the precedence over the latter since haste is the primary consideration. The methods suggested must suit the conditions of the peasant farmers who form the bulk of the cotton growers in the states and whose joint contribution even at small levels of increase will ultimately result in substantial overall production without the need for providing vast amounts for capital expenditure or special equipments. There are a number of items of agronomy which have proved their worth in the experiments conducted at the Agricultural Research Stations and which can be put across to the cultivators without seriously upsetting the existing farming practices. The long and short term measures advocated in this article are those found useful in the experiments conducted by the Madras (Undivided) state and tested partly or wholly on cultivators' lands under Cotton Extension Plan or on which further research will prove profitable.

Improvement of Irrigation Sources — Long term: Largest measure of increase in yield per acre is realised from irrigation and therefore improvement of irrigation sources will result in a substantial increase in production. The whole of the irrigated cotton in Madras is grown under wells fitted with electric power, oil engines, *mhotes* or *picotahs* depending on the activity of underground springs and the height of lift to ground level. The information on the wells in the several districts having independent ayacuts and supplementing known irrigational sources is furnished in Statement I. It may be seen that the majority of districts have wells with an average capacity of less than three acres, the exceptions being Ramnad and Nellore. The low ayacut is partly due to intensive cultivation of crops like sugarcane, paddy and plantains requiring greater quantities water and partly due to poor springs in the wells. The subsidised well digging campaign recently launched by Government, followed up with hand and power boring for tapping underground water, extension of electric power and supply of oil engines in non-power area will leave a lasting impress on the agriculture of the tract especially in the existing cotton growing districts of Coimbatore, Salem, Tiruchirapalli, South Arcot, Madurai, Ramanathapuram, and Tirunelveli where the practice of raising two crops in one year based on cereal—cotton rotation is already in vogue, and where the average yields per acre are high on account of good land use and farming standards. Water stress and intensive cropping necessitate the cultivation of short duration cotton varieties. The spread of Cambodia cotton in Ramanathapuram district as summer crop would not have soared to 29,000 acres during the peak period but for the development of MU 1. Evolution of long staple varieties having

STATEMENT I

Districts		Rainfall June to August (inches)	Total No. of wells of all sorts	Area under wells having independent ayacut (acres)	Area under wells supplementary recognised sources of irrigation (acres)	Total area irrigated from wells (acres)	Average area irrigated per well (acres)
Nellore	..	7·1	13,834	164,256	1,001	165,257	11·1
Chingleput	..	10·5	27,935	15,267	35,380	50,467	1·8
South Arcot	..	10·1	78,003	18,734	69,440	88,174	1·1
Chittoor	..	9·5	33,436	84,142	3,348	87,490	2·6
North Arcot	..	11·1	134,663	121,673	52,729	174,402	1·2
Salem	..	9 0	102,287	117,982	62,417	180,399	1·8
Coimbatore	..	5·0	108,244	376,355	112	376,467	2·6
Trichinopoly	..	6·7	72·020	91,623	205	91,828	1·3
Tanjore	..	7·1	33,134	1,976	10,201	12,177	0·4
Madura	..	5·4	59,857	134,929	384	135,313	2·5
Ramnad	..	4·5	18,743	104,139	993	105,832	5·6
Tinnevelly	..	2·3	41,527	94,677	644	95,321	2·3

a shorter life than MU 1 will help the expansion of cotton crop in other districts where the limiting factors are water, planting time and climate during growth or harvest.

It is very fortunate that cotton among the irrigated crops requires the least quantity of water during growth, can withstand a certain amount of water stress and can be normally grown in all seasons provided atmospheric temperature is not very high at flowering phase or the rainy weather does not coincide with ripening and harvest phases. The successful utilisation of rice fallows in the State will therefore depend on the development as well as the solution of problems pertaining to the three following main groups :–

(a) The tracts where the South West monsoon is weak and the North-East rains are strong and where during the June, July and August months, the temperature does not fall below 80°F or the winds do not blow with excessive velocity, are mostly the canal-fed portions enjoying fair supplies of underground water for lift irrigation during summer months or capable of development through assisted well sinking. Such areas can be further sub-divided into long and short fallows.

(i) Long fallows extending over seven months from middle of February to middle of Septemper exist in single crop wet lands fed by canals from river projects and tanks. The districts coming into this category will be the whole or part of Tirunelveli, Ramanathapuram, Madurai, Tiruchirapalli, Tanjore, South Arcot, Chengleput, North Arcot, Chittoor and Nellore.

(ii) Short fallows of five months from mid-January to the cultivation of *Kuruvai* paddy in July (the actual fallow months being specific to each region in a district) are found in areas where two crops of paddy are taken, one closely following the other or with a long gap between the two. In the latter case where the paddy is grown during summer months, cotton can replace it. The area falling in this classification lies in Tirunelveli, Madurai, Tiruchirapalli. Tanjore, South Arcot and Chengleput districts. Fuller details about the possible developments of the rice delta of Cauveri are furnished by Balasubrahmanyan (1949, 1952).

(b) The zones where the South West rains are plentiful, the second monsoon is weak, winter temperature is not low, the

summer temperature is not too exacting and good surface springs exist, comprise the rainfed paddy areas in portions of Malabar and South Kanara districts especially near river courses. Cotton can be planted in September—October and kept on till March—April months.

(c) The regions where both the monsoons are fairly active or where the winter temperature touches low levels ranging from 54°F to 65°F or where the summer is characterised by hot winds or high temperature exceeding 110°F and where good underground springs can be tapped, cover the districts of Srikakulam, Visakhapatnam, East Godavari, Kistna, Guntur, Kurnool, Bellary, Anantapur, Cuddapah, Salem and Coimbatore. This area will admit of cotton planting in December but the crop will have to be removed by mid June to give place to rice crop.

Any improved variety developed for item a (i) at Srivilliputtur in the long staple cotton scheme, will suit all the specified districts except the delta and river project areas where the double and single crop wetlands lie intermingled, where the cultivation of the former will affect the cotton grown and retained in the latter, and where the field to field irrigation and seepage from canals cannot be avoided. P. 216 F and development of similar short duration varieties possessing a total crop life not exceeding four and a half months will fit in the category a (ii). Long and short duration cotton types will suit item (b), the two limiting factors being the availability of water for plentiful irrigation during the hot months of February and March and the capacity of cotton varieties to resist the adverse effects of heavy dew in December—January. High temperature and low humidity have been shown to cause contabescence, to induce flower shed and to affect proper seed development. Item (c) will come under this distress group. The preliminary observations on early sown cotton crop in these districts have shown that the cold soil in winter is not conducive for growth and that the crop remains stunted till the summer weather sets in. There is thus no great advantage in early planting during November—December. In other words, a variety having not only a shorter duration than P 216 F but capable of withstanding a high atmospheric temperature exceeding 110°F. during flowering phase must be found.

The larger development and utilisation of the three categories of fallow land outlined above are delayed not on account of non-availability or impossibility of breeeding suitable varieties of cotton

but due to the existence of inadequate facilities for off seasonal irrigation. Recent efforts made by the State Agricultural Department in tapping underground water resources by sinking filter points have demonstrated a new idea for an average farmer. The success and possibilities have been well commented upon. The filter point wells cost Rs. 200 for sinking and Rs. 1,750 for power. Ten acres of cotton can easily be cultivated under each such well as the crop normally requires irrigation only once in ten days during the hottest period of summer. The expenditure incurred on driving filter points and on providing the necessary power for lift irrigation will be paid many times over in the course of a few years by the increased profits brought in through the off seasonal cultivation of a cash crop like cotton. It is time that funds from private sector are mobilised and utilised for the rapid development of the water resources of the tract instead of depending on the slow assisted development by the State. Formation of co-operative societies for the grant of loans required for well sinking and purchase of oil engines or electric motor with pump sets and for assistance in marketing the crop, will go a long way in the above programme. Other possibilities which require examination and implementation at State level are the river pumping schemes and provision of irrigational facilities for cultivation of cotton crop during summer months in localised compact blocks under perennial canal zones. The yields of the new short duration cotton P 216 F were so encouraging that big rice farmers of Shiyali Taluk in Tanjore district owning lands under the South Rajan canal and Pudumane river sent a representation to Irrigation Department and appealed to brother farmers for giving up the limited cultivation of short duration rice in summer and for switching over to the more paying cotton on wider area for the same quantity of irrigation water.

The trials with cotton variety P 216 F on Agricultural Research Station at Aduthurai and the results of pilot schemes launched under the Cotton Extension Scheme in the year 1950 in the Tanjore and South Arcot Districts have demonstrated beyond question that cotton could be grown profitably during the short follow period of four and a half months on all kinds of soils in both single and double crop lands provided adequate and timely irrigation was given and that no untoward effects on the succeeding rice crop need be apprehended. The green residue amounting to 6,000 lb. per acre left by cotton crop when incorporated in the soil, acted as green manure and registered yields similar to another field receiving green manures of other types. The development of such

tracts is primarily dependent on the creation of irrigational facilities during off season but not on evolution of other special short duration varieties. Ultimately it will be possible to rope in at least five lakh acres for growing cotton on rice fallows. We have now correct and good information about possible centres of useful material. They are Africa, America, Persia, Punjab, and Bombay. The list can be amply supplemented with other world collections and early duration hybrids synthesised at Coimbatore from wild cotton varieties and early duration types. These varieties can be tested first for growth, duration and yield on different soils, planting dates and climatic factors and observed for shedding, pests, diseases and fibre properties. The selected types after one or two seasons may be tried on half acre plots. The agronomy of the crop must receive greater attention than breeding and the effects on succeeding rice crop must be correctly established. No crop of cotton should be advocated for growing without the application of fertilisers. The enquiry must be on optimum dosage required for obtaining a good return from cotton and the succeeding paddy as well.

In parts of Chengleput, North Arcot and Chittoor districts, large blocks of land are lying fallow during summer in spite of the existence of a number of wells, as the tendency is to grow rice in preference to other crops. The Agricultural Department demonstrated that the short duration cotton could be grown with advantage on thrice the area with the same irrigation and labour facilities. Of late the stemborer damage on rice crop has been rather serious and regular, that the farmers have developed a voluntary desire for growing alternative cash crops requiring less attention and greater profits in the present context of falling prices for food crops. The main bottle neck for expansion is stated to be marketing and if measures for the quick disposal of harvested cotton at fair price can be devised in such non-cotton growing districts, there will be a greater enthusiasm for its cultivation.

Two new projects viz., Tungabadhra and Lower Bhavani are nearing completion and water is expected to be let in during 1954–55. The entire estimated ayacut will, however, take time to develop and to settle down to normal cultivation. Other projects are in the offing. In addition to the direct benefits accruing from the major river projects, it is also expected that the water table in the project zones will rise when the canals carry water and enable sinking of wells to supplement the water supply in high level lands

situated in the vicinity of the canals throughout its course. Eventual increase in cotton area inclusive of the immediate expansion anticipated in the two completed river projects can be placed at four lakh acres. Breeding work and agronomical enquiries done on American cotton at Siruguppa for the Tungabadhra project have yielded valuable information. Varieties resistant to blackarm (Balasubrahmanyan & Kesava Ayyangar, 1952) have been evolved and agronomic problems relating to Jassid damage (Balasubrahmanyam & Kesava Ayyangar, 1950) have been solved. Luxmi cotton can be recommended for large scale cultivation until seeds from more productive, better quality and higher resistant types already evolved by breeding are multiplied and supplied. The problems of Lower Bhavani Project are comparatively simple. The cultivation of Cambodia cotton is not new to the area and M U 1 variety fits in well. The urgent need of the tract is improvement of the fertility status of the soil and layout of the individual holdings for canal irrigation. The State has already taken the necessary steps to provide the technical and monetary help in the project areas and it is hoped that with the contribution made by the benefiting farmers, the production targets will be realised sooner than anticipated.

Manures—Long Term: A majority of farmers in Madras State apply all the cattle manure and compost available with them to cereal crops like Sorghum, finger millet and Italian millet which precede the cotton crop in normal rotations under a belief amounting to conviction to that direct application of manure to cotton encourages the leaf growth without increasing its yield per acre. It is only the cotton farmer of the irrigated cambodia who devotes some attention to the aspect of manuring crop with his own farm and animal wastes while a few of them who are progressive in out look and who are conscious of the benefits from oil cakes and ammonium sulphate resort to such supplementary applications as a regular feature. The rate of manuring however varies considerably from holding to holding and is entirely dependent on the solvency of cultivator. It is this factor which is responsible for the wide range of yields varying from 200 lb. to 900 lb. lint per acre and for an overall average of 270 lb. lint per acre for all irrigated cotton in the State.

The average acre yields of cotton in America are 450 lb. lint under irrigation and 250 lb. lint for unirrigated crop. The corresponding figures for Madras are 300 lb. and 125 lb. per acre for the

highest yielding zones in Cambodia and Karunganni tracts. In many of other areas, the yields are very low and do not exceed 50 lb. lint per acre. No American farmer will think of growing cotton without manure whether he raises the crop under irrigation or with the aid of rains. The national yield of America which was 160 lb. per acre in the year 1929 was raised to 289 lb. per acre in a period fifteen years through (a) increasing both the plant-food of contents and the quantity of fertilisers applied to every acre from 266 lb. to 326 lb., and (b) restricting the application of commercial fertilisers to zones receiving adequate rains or served by river projects.

The analysis of manurial trials done by Panse (1945, 1952) had definitely shown that manuring was profitable in areas where the cotton crop received irrigation or grew with an annual rain fall of about 30 inches. In the experiments carried out on the Government farms of the State, the cotton crop did benefit by manuring and did register increases in kapas yield especially in the irrigated Cambodia area and the un-irrigated Karunganni tract wherever the levels of soil fertility ranged from medium to high. The average responses of 200 lb. seed cotton per acre for a dose of 40 lb. Nitrogen (2 cwt. of Ammonium sulphate) on irrigated Cambodia and 70 lb. kapas per acre for an application of 20 lb. Nitrogen (1 cwt. of Ammonium sulphate) on un-irrigated Karunganni were obtained. At Koilpatty which is a rainfed Karunganni area, application of every pound of Nitrogen yielded an extra pound of lint on soils of low to medium fertility and two pounds of lint on lands of high fertility. The response of un-irrigated Cambodia enjoying a pre-war normal area of two and half lakhs of acres will be the same.

The best way of applying the fertiliser to Cambodia is to spread evenly by broadcast one cwt. before ridging up the fields for planting and to apply the second cwt. at hoeing in the month of December. In the case of farmers who are obliged to plant cotton late in stubbles after a crop of ragi, the first application may be in the month of December followed by another dose in January. Irrigation should invariably follow the manure application when the crop is on the field. On the blacksoils where Karunganni and Tinnies cottons are grown, one cwt. of Amonium sulphate may be spread at about the same time the seeds are sown broadcast and covered with country plough.

The largest demand from the Textile Industry of India is for cottons of the medium and long staple ranging from 12/16 inch to 17/16 inch which are suitable for spinning 30's to 40's warp counts. Internal production of these styles, if stepped up, will reduce the foreign imports. The easiest and surest way of achieving the above objective is without doubt through a wider use of artificial fertilisers in the districts of South Arcot, Tiruchirapalli, Salem, Coimbatore, Mathurai, Ramanathapuram and Tirunelveli where good quality cotton varieties are now grown both as irrigated and rainfed crops. The Sindhri Fertiliser Factory has already been geared for full production, at the rate of 1,000 tons of ammonium sulphate per day. Even though the entire nitrogen requirements of the cotton area in Madras State cannot be met from the internal production, it will prove cheaper to import fertilisers than raw cotton. The data collected during the years 1950–53 from the Cotton Extension work in Madras disclosed that the farmers of irrigated Cambodia who spent Rs. 35/- per acre on fertilisers were able to reap on an average a gross profit of Rs. 100/- while their bretheren growing unirrigated crops could realise profits of Rs. 30/- on every acre of Karunganni cotton manured at a cost of Rs. 17/- per acre. A very significant finding was that in the two regions manuring was a profitable venture even under adverse climatic conditions. Regeneration of growth and bud formation soon after rains and after a wave of insect damage was much more evident in manured lands than unmanured blocks.

It is very necessary that persistent and intensive propaganda for application of nitrogenous fertilisers in the two project areas nearing completion viz. Lower Bhavani and Thungabadhra, where irrigated cotton will figure as important item, is done by special staff until the entire ayacut is fully developed and agricultural practices are fully established.

Crop Rotations — Long Term: Minor adjustments in crop rotations have been known to bring about a marked change in the productive capacity of the soils especially on the unirrigated areas. In such agronomic enquiries the legumes have played a major role. The experiments conducted at the several centres in Madras have already been summarised by Balasubramanyan (1947). The review indicated that legumes other than groundnut, tur, horsegram and gram for seed and *pillipesara, guara* for green manure were unprofitable.

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Irungu sorghum for fodder and *bajra* for grain are the two principal rainfed crops grown by the cotton farmers of Ramanathapuram, Mathurai and Tirunelveli Districts over an area of 3,50,000 acres every year as a crop preceding Karunganni cotton. Irungu sorghum has been observed to have a depressing effect on the yield of succeeding crops. The loss in the yield of seed cotton following a crop of Irungu sorghum is estimated to range from 10 to 25 percent of a crop of cotton following *bajra.* The farmers though fully alive to this reduction are forced to continue the practice in order to raise the necessary cattle fodder needed by them. The monetary loss so sustained by every farmer for every acre of cotton planted after Irungu sorghum will be roughly Rs. 10/- on an average. The experimental data collected for over 10 years at the Agricultural Research Station, Koilpatti on the cause for the depression in the yield of cotton following Irungu sorghum and the ameliorative measures which would more or less correct them completely indicated that the mixed cropping of Irungu sorghum and indigo corrected the ill-effects and raised the yield of cotton to the level of the *pre-bajra* cropping. An average increase of 10 lb. lint per acre was obtained. Seeding Irungu mixed with 12 lb. indigo added about 20 lb. Nitrogen per acre through the activity of nodular organism in the roots and the opened up the soils well during summer. The yield of Irungu sorghum was not reduced in such mixtures. This practice when extended to the *bajra* crop was also noticed to benefit the succeeding cotton crop to an appreciable extend. A mixture of Irungu sorghum and *bajra* with 12 lb. of indigo per acre is recommended for general adoption. After the sorghum or *bajra* is harvested, the small indigo plants so far suppressed by shade and crowding of the associated crop put on good growth assisted at times by the summer showers received in April. The fields may be ploughed in May–June by incorporating the leguminous crop in the soil. The subsequent treatments are same as those of any other field on which cotton sowings are planned. It is a simple farming practice which if enforced will substantially add to the cotton production of the Karunganni tract.

The sorghum-cotton rotation in irrigated regions of Coimbatore district is an establshed farming practice. The sorghum crop is planted in March and harvested by July while the Combodia cotton in dibbled in by the end of August and removed by the beginning of March. The cotton crop was found to give only

about 90% of its potential yield leading to an average fall of 20 lb. lint per acre. Experiments conducted for a number of years at Cotton Breeding Station, Coimbatore revealed that summer sorghum and *guara* mixed in the ratio of three to one had no effect on the yields of both fodder and grain but increased the yield of the succeeding Cambodia cotton. All the ryots following the intensive rotation of cotton-sorghum under irrigation would be well advised to grow a three to one mixture of summer sorghum and *guara* instead of pure summer sorghum. The *guara* crop comes to the maturity more or less at the same time as the sorghum crop and can be harvested along with summer sorghum for being fed to cattle which relish the mixture better than the pure summer sorghum straw considered inferior to the rainfed *periamanjal* sorghum sown in cold whether in the same area. The practice if it gets into vogue will be similar to the legume mixtures like green gram, cowpea or lablab grown with the rainfed grain sorghum in other parts of the State. The improvement in the fertility of the soil will be gradual but lasting. It will be ultimately reflected in the yield of Cambodia cotton which will increase by 60 lb. kapas or 20 lb. lint valued at Rs. 25/- per acre. Lands can be enriched without any investment. Its adoption over the whole of the early planted area of 25,000 acres in Coimbatore district would raise the production of Cambodia cotton by 1,000 bales of lint per annum.

(To be continued.)

OBITUARY

We note with deep regret the passing away of Raja Sri V. Madhava Rajah of Kollengode who was one of our patrons from early days. He evinced keen interest in agriculture and its problems and was a frequent visitor to the College Day Conferences and was present even during the 1954 session. May his soul rest in peace.

A Preliminary Note on the Study of Inter-racial Hybrids in Rice

by

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Introduction: In general, the rice varieties grown in Japan belong to *Oryza sativa* forma *Japonica* which are characterised by short stature, stiff straw, non-lodging habit, and have short and and coarse grains. Generally they are heavy yielders, the average yield being 4,000 lb. of paddy (rice in husk) per acre. In addition, these varieties show definite response to fertiliser applications. The rices that are cultivated in India belong to *Oryza sativa* forma *Indica*. The *Indica* rices easily lodge in most of the cases and the average yield of these varieties is less when compared to that of *Japonica* rice. Hence to combine the useful genes that exist in the two different races of rice, crosses were effected at the Central Rice Research Institute, Cuttack and the hybrids were distributed to the different States for study. The present note deals with the observations recorded during the study at the Paddy Breeding Station, Coimbatore.

Materials and Methods: F2 seeds of ten sets of the following crosses, namely GEB. 24 x Norin 1, Norin 6 x GEB. 24, Norin 18 x GEB. 24, GEB. 24 x Norin 23, Asahi x GEB. 24, GEB. 24 x Asahi, GEB. 24 x Rikuu 132, Rikuu 132 x GEB 24, GEB. 24 x Tihoku 6 and GEB. 24 x Taichu 65 were received from the Central Rice Research Institute, Cuttack during 1952—'53. The study in the F2 generation consisted in growing single plants in rows one foot apart with a spacing of six inches between the plants in the row. Height of plants, number of ear bearing tillers per plant, pigmentation, presence of awn on the spikelet, number of grains and chaff in the panicle were the main features studied. In each set of cross not less than 500 plants were studied for the above characters and desirable progenies were selected. The progenies in F3 generation were studied for the segregation of parental characters and response to heavy manuring by growing them under two different doses of manure. The heavy dose of manure used in the study consisted of 6,000 lb. of green manure, 225 lb. of superphosphate and 200 lb. of ammonium

sulphate per acre, the normal dose of manure being 4,000 lb. of green leaf, 150 of superphosphate and 100 lb. of ammonium sulphate per acre. Observations regarding growth under the two conditions were made periodically and counts of ear bearing tillers and height of plants, were recorded.

Observations: The F2 progenies were found segregating for morphological characters like pigmentation, colour of foliage and pericarp and other attributes such as height of plants, tillering habit, thickness of culm and non-lodging character, length of panicle, size and arrangement of grains, tendency for production of awns and sterility. Variation for pigmentation was noticed to a great extent since the parents involved possessed these characters. The progenies were segregating for pigmented and non-pigmented plants as shown in Table 1. In general, non-pigmented plants were more than the pigmented plants. Variation for colour of foliage such as light green and dark green, was also noticed in few of the progenies. Presence of red riced plants was another feature though the parents were all white riced ones. A few plants of the *Japonica* parents grown along with the progenies for comparison were very short in stature having a height of about two feet with eight to twelve earbearing tillers per plant. The panicles were short with 30–40 grains per earhead. The progenies were segregating for dwarf and tall plants resembling the *Japonica* and *Indica* parents and for intermediate types. The mean height of *Japonica* types ranged from 1′–7″ to 2′–0″ that of *Indica* types ranged from 2′–10″ to 3′–4″ and that of intermediate types from 2′–2″ to 2′–8″. Counts of these types in the F2 population consisting of not less than 500 plants in each cross revealed that Japonicas ranged from 1·5 percent to 21·2 percent, Indicas ranges from 33·5 percent to 79·9 percent and the intermediate types ranged from 16·9 percent to 62·2 percent. Similarly a record of the number of earbearing tillers made in each plant showed that the progenies resembling the *Japonica* parents had tillers ranging from 2·0 to 5·6, those resembling the *Indica* parents had tillers ranging from 6·2 to 8·9 and the intermediate types 5·2 to 7·6. A number of plants with stiff straw and non-lodging habit were also noticed. Sterility was prevalent to a great extent and unsetting of spikelets was predominant. The percentage of setting varied from nil to 100 and fully sterile plants were not uncommon. Very few plants with full fertility were met with. However, a count of fertile and sterile spikelets in each panicle from 25 plants in each of the hybrid which were carried forward for further study showed, a sterility percentage ranging from

21·0 to 32·3. Presence of awn was another interesting feature though the parents involved were awnless. Plants with tip, medium and long awned spikelets were noticed. The data collected from the study of the F2 progenies are presented in Table I.

The performance of the F3 progenies under ordinary and heavy manured conditions is shown in Table II. Only four sets of crosses consisting of 131 progenies were studied for their behaviour under these conditions- Height of plant and number of earbearing tillers of ten plants in each of the progeny were recorded and the mean for each set of cross is presented in the table. It may be seen from these data that the progenies had grown taller by two inches to six inches under heavy manuring than under ordinary manuring. Similarly the number of tillers are also more.

Summary of Results: Of the various attributed studied in F2 and F3 generations of the different sets of inter-racial crosses, namely, *Oryza sativa* forma *Indica* and *Oryza sativa* forma *Japonica*, height of plant, productive tillers and spikelet fertility may be considered as important from the point of view of productivity. Japonicas are short statured and unsuitable for growing under our conditions. Hybrid progenies which combined good tillering, thick culm and non-lodging habit and fully fertile forms were met with and it appeared that further elimination of undesirable characters in the subsequent generations are quite possible by continuous selection. It also appeard from the study of the F3 progenies under different conditions of manuring that they respond favourably well to higher fertility and it might be possible to fix up hybrids which would respond to heavy manuring. For achieving this, selection of progenies should be done by growing them under high fertility. Further studies in these directions are in progress.

Acknowledgment: My thanks are due to Sri M. B. V. Narasinga Rao, B. A., B. Sc. (Ag.), Assoc. I. A. R. I., now Paddy Specialist (Andhra State) under whose guidance the studies were initiated. I am also grateful to Sri K. Ramaswamy, B. Sc. (Ag.), Paddy Specialist for his kind interest in preparing this note and to the Director, Central Rice Research Institute, Cuttack for the supply of seeds.

TABLE I. F2 Progenies

S. No.	Particulars	Pigmented Plants			Non-Pigmented Plants			Habit			Mean Height			Mean Tillers			
		Japonica %	Indica %	Intermediate %	Japonica %	Indica %	Intermediate %	Japonica %	Indica %	Intermediate %	Japonica ft. inch.	Indica ft. inch.	Intermediate ft. inch.	Japonica	Indica	Intermediate	Sterility %
1.	GEB. 24 × Norin 1	57·4	53·9	48·7	42·6	46·1	51·3	18·4	37·8	43·8	2 — 0	2 — 11	2 — 5	4·4	6·6	5·2	21·0
2.	Norin 6 × GEB. 24	1·7	14·4	1·1	98·3	85·6	98·1	21·2	47·1	31·7	1 — 11	2 — 10	2 — 6	4·9	6·3	5·3	23 5
3.	Norin 18 × GEB. 24	—	14·6	4·5	100·0	85·4	95·5	7·8	62·5	29·7	1 — 11	3 — 0	2 — 5	4·0	6·2	5·2	25·4
4.	GEB. 24 × Norin 23	—	11·6	2·9	100 0	88·4	97·1	15·7	53·4	30·9	1 — 10	2 — 11	2 — 5	2·0	6·5	5·2	23·3
5.	ASAHI × Norin 24	—	17·1	2·4	100·0	82·9	97·6	4·3	33·5	62·2	1 — 8	3 — 4	2 — 7	5·6	8·9	7·1	28·4
6.	GEB. 24 × ASAHI	10·0	9·1	—	90·0	90·9	100·0	3 6	35·2	61·2	1 — 7	3 — 1	2 — 6	5·4	7·7	7·6	25·1
7.	GEB. 24 × RIKUU 132	52·4	47·8	55·2	47·6	52·2	44 8	6·1	60·6	31·8	1 — 8	2 — 11	2 — 4	4·0	6·6	5·5	21·5
8.	RIKUU 132 × GEB. 24	40·0	57·2	56·1	60·0	42·8	43·9	7·1	66·3	22·3	1 — 7	2 — 10	2 — 2	4·4	6·7	5·8	26·3
9.	GEB. 24 × TIHOKU 6	—	13·6	5·3	100·0	86·4	94·7	4·0	69·0	25·3	1 — 9	3 — 0	2 — 5	4·8	7·0	6·0	27·0
10.	GEB. 24 × TAICHU 65	—	19·6	14·5	100·0	80·4	85·5	1·5	79·9	16·9	1 — 7	3 — 4	2 — 8	2·8	7·0	5·4	32·3

TABLE II. F3 Progenies

S. No.	Particulars of Cross	Number of Progenies	Mean Height		Mean Number of Tillers	
			Ordinary Manuring	Heavy Manuring	Ordinary Manuring	Heavy Manuring
1.	GEB. 24 × TAICHU 65 ..	52	3′ — 6″	4′ — 0″	5·0	5·5
2.	RIKUU 132 × GEB. 24 ..	26	3′ — 4″	3′ — 8″	5·3	6·5
3.	GEB. 24 × RIKUU 132 ..	27	3′ — 5″	3′ — 9″	5·3	6·4
4.	GEB. 24 × TIHOKU 6 ..	26	3′ — 9″	3′ — 11″	4·6	5·6

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Research Notes

A peculiarity of flowering in gingelly (*Sesamum indicum L.*)

Flowering in gingelly is normally of the racemose type with a flower in each leaf axil. Two extra floral nectaries are found on either side of the flower. In a few varieties and types one or both of these nectaries develop into flower and produce capsules. The result is the characteristic whorled appearance in each leaf axil and the type is described as 1 to 3 flowers in an axil. This is obviously an economic character in that the production of capsules per plant is increased. An extracted pureline X-52-a (cross between S. I. 61, Dholka & S. I. 1, Local) is the standard type for the character maintdined on this Research Station. Even in this type a few leaf axils may produce only a single or two flowers but a majority have three flowers. A selection S. I. 1047 from the local variety of Samlkot also exhibits this character.

Though found in only a few varieties this character breeds true to type and has therefore been taken as a distinguishing feature in the classification of gingelly varieties by KashiRam (1930), Rhind & Thein (1933) and Hilterbrandt (1932). The inheritance of this character was worked out by John (1934), who found that single flower in an axil is dominant to 1 to 3 flowers in an axil.

During the 1953-54 could weather season (November 1953–February 1954) the character was found to occur in a large number of varieties and types raised on this station. A detailed study of these revealed that the character was expressed to varying degree, 0 to 41 percent in the thirty three varieties and types studied, the results are given in the following table :—

Number of varieties	Percentage number of plants in the population showing the character
1	Nil
7	5 and less
16	6 to 6
9	Above 20

The local variety in a cultivator's bulk field situated about two miles from this Research Station was examined and found to show the character. Of the 291 single plant selections made 131 (nearly 45%) revealed 1 to 3 flowers in an axil. The material will be utilised for continuing the study in the ensuing season.

It is clear therefore, though the character is inherited one its expression is largely controlled by seasonal conditions. This phenomenon has not been observed for the last few years. During the year 1953-54 a rainfall of over 2″ just prior to general flowering is probably the reason for the expression of this character to a lerge extent. An analogous case is found in the character of 1 to 3 kernelled nature of groundnut pods which though a varietal character, is largely controlled by rainfall and its distribution.

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M. BHAVANI SHANKER RAO and V. SUBBIAH.

A Note on the Abnormal Development of Brackets in the Spadix of Coconut Palm (*Cocos nucifera* L.)

Various abnormalities have been observed and recorded in coconut by various workers from time to time and reviewed by Sundararaj (1952) and Davis and Menon (1953). Polyembryony, branching of the stem, foliation of the spadix, bulbuliferous spadix, suckering, unbranched spadix, development of the pistillodes in the male flowers, apocarpy are the commonly known instances in the coconut palm. In this paper, a multispatheate condition observed in the spadix of a coconut palm is described.

In a normol spadix of the coconut palm there is a single spathe which is elongated, boat-shaped and is about the same length as the spadix. Just outside this and extending nearly a third of its length, is a fibrous sheath-like bract. The outermost or the first bract is very small in nature. At the base of the spadix, inside the spathe, is seen the inner-most inconspicuous scaly bract. Besides these four bracts, there are many small secondary bracts which subtend the reachillae or branches of the spadix.

Davis and Menon (1952) describe the development of the innermost bract which becomes as big as the normal spathe or sometimes even slightly bigger, leading to a bispatheate condition of the spadix. Davis (1947) observes in a bulbuliferous coconut palm, the development of the inconspicuous secondary bracts subtending the rachillae which are reduced to rudimentary buds. These bracts developed to their maximum which gradually became true pinnate leaves. The same author has also quoted Sands who has reported a case of unbranched spadix, in which the rachillae are highly reduced to the state of only 3 or 4 flowers and the rudimentary bracts subtending the rachillae have developed considerably and are conspicuous and big enough to cover and protect the flowers in their axils. In the variety "Spicata" described by Jacob (1941), these bracts have developed to a conspicuous size. Petch (1915—'17) describes an interesting case of prolification in the spadix; the spathe terminated in a solid stalk-like tip about 5 inches long which bore a fan-shaped leaf and undivided like the first leaves of a seedling coconut. The secondary bracts also exhibited excessive development but was attended by the entire or partial suppression of the spikes. In one region of the inflorescence, the flowering branches were represented by aborted shoots.

In the present case of abnormal spadix which was handed over to the author by Bhaskaran, a student of the Agricultural College, Coimbatore there were many fairly well developed spathes each subtending a flowering branch in its axil, besides the normal spathe. The innermost bract found at the base of the spadix in a normal inflorescence and the secondary rudimentary bracts subtending the spikes have all developed to appreciable sizes. (Fig. 2). The normal spathe and the spathes resulted due to the development of the innermost bract and some of the secondary bracts can be seen in Fig. (1). Each of the flowering branch is well protected by a spathe, while the spadix as a whole is protected by the main spathe. This sort of excessive development of the bracts has been attended with the complete absence of the female flowers in the spadix (Fig. 2). The male flowers of the inflorescence were found to be quite normal with three sepals, three petals, six stamens and a centrally placed pistillode of three erect processes. Since self-fertilization is common in coconut, this palm with only male flowers may not be economically useful. Further, the spadices which appeared subsequent to the one described in this article are all said to be of the same sort.

Further, the behaviour of this coconut palm, as understood from the owner is very peculiar. The tree which is in Badagara (Malabar) is said to be about 40 years old and was producing normal spadices with female flowers for a long time; but all the female flowers shed, none of them developing, into fruits. For the past four years it is said to be producing these abnormal multi-spatheate spadices without female flowers. The reason for the change in the sex expression of this palm though not known, may be due to virus and requires investigation.

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D. MEENAKSHISUNDARAM.

Abnormal Development in the Spadix of Coconut Palm

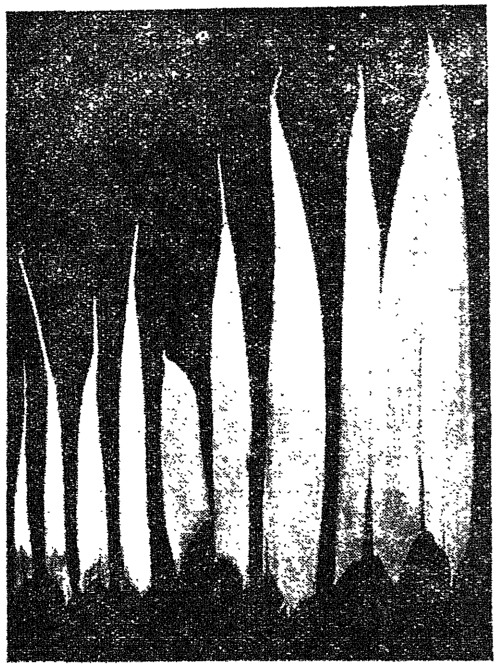

Fig. 1

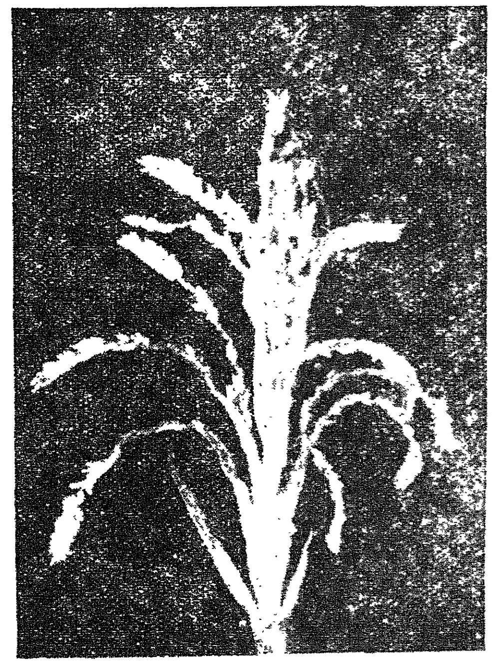

Fig. 2

Viability of Wild Indigo Seeds

Fig. 1

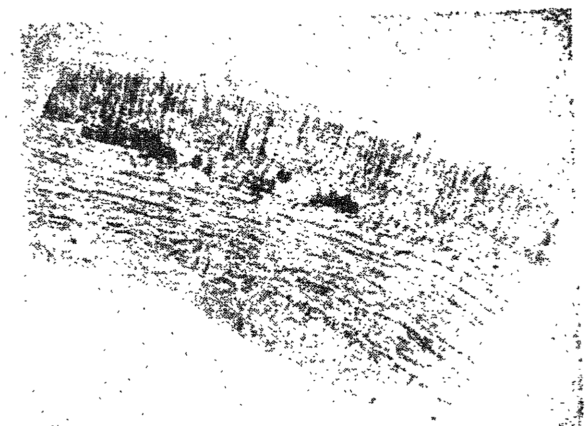

Fig. 2

On the Viability of the Wild Indigo Seeds

In a research note published by the author under reference cited it was shown that seeds of Wild Indigo (Thephrosia purpurea) do not give full per cent germination due to a thick deposit of wax on some of the seeds present and not due to the hard seed coats that these seeds have, as is popularly believed. In Wild Indigo, there exist two morphologically different kinds of seeds, one with a hard seed coat and another with a soft one. The former does not readily sprout in contact with moisture, whereas, the latter instantly does. The hard seed has a thick layer of wax upon its seed coat while the soft one has only a very insignificantly thin layer of wax. The accompanying cross sectional photographs taken under the same magnification of the hard seed coat (Fig. 1) and of the soft one (Fig. 2) serve to illustrate the comparative thicknesses of wax layer upon these two kinds of seeds.

REEERENCE

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Vellore.

NEWS AND NOTES

A General Body meeting of the Agricultural College Students' Club was held at 6 P. M. on 18—5—'55 with Dr. A. Mariakulandai, the Vice-President in the chair, to elect the Executive Committee and Office Bearers of the Club for the year 1955-'56.

The following students were elected as membrs of the Executive Committee for the posts noted against each :—

1. Sri P. Kandaswamy Gounder of Class III as the Club Secretary; 2. Sri K. Marappan of Class III as Games Secretary; 3. Sri Rajaram Upadyaya of Class II as Cricket Captain; 4. Sri Muthukrishnan of Class II as Tennis Captain; 5. Sri Dhanapalan of Class III as Hockey Captain; 6. Sri Sankarapandian of Class II as Foot-ball Captain; 7. Sri Kailasam of Class II as Minor Games Captain; 8. Sri K. Parthasarathi of Class III as the representative of his Class and 9. Sri Manickavasagam of Class II as the representative of his Class.

As Office Bearers outside the Executive Committee the following students were elected for the current year :—

1. Secretary, Photographic Society — S. Hydroos; 2. Secretary, Social Service League — Purushothaman; 3. Secretary, Debating Society — Govindarajulu; 4. Secretary, Dramatic Society — R. Perumal Raja; 5. Secretary, Hiking Society — M. Thankavelu; 6. The "Tatler" Editor — S. Haja Sheriff; 7. Lady Students representative — Kumari V. Savithri.

The Volunteer Corps for the year was also formed with the following students :—

M. K. Muliar (Leader); Theetharappan (Asst. Leader); D. V. Viswanath; M. Saldhana; Sivaraman; Marappan; Soundarajan; Dhanapalan; Navakodi; Gopinath; Hydroos; Ramanathan; Jesudasan; Muthiah; Subbiah; Javad Hussain; Kumari V. Savithri; Vivekanandam; G. Venkatesan; Aravindakshan; C. V. Ramachandran; Rajaguru; S. Palaniswamy; Thottiappan; K. Nagappan; Chandrasekara Nair; Rajamani; D. D. Chinnappa; Ramalingam; P. Kanniah; Chinnaraj; Jagadesan.

GLEANINGS

Tuyyamalli (A S D. 8) A High Yielding Strain of Paddy: Tuyyamalli is a variety of paddy grown in Tirunelvely district particularly in Ambasamudram and Tirunelveli Taluks as a catch crop from June to September, in the seed bed areas intended for raising Pishanam (Second crop) nurseries. The crop is generally raised as a broadcast one, after the land is prepared to a good puddle. But the variety also lends itself to transplanting. As the duration of the crop from seed to seed is only 80 days. the seedlings should not be kept in the nursery for more than 15 to 18 days. The husk is dark brown in colour and the rice, red which becomes white on milling. Even A D T. 3. which has established a name for earliness and is popular in a number of places, is longer in duration than Tuyyamalli by about a week. For this reason, it is admirably suited for areas dependent on tank water supply as in Ramanathapuram district and Pudukottai area of Tiruchirapalle district and even in other districts where similar condition prevail. As regards the yield, 3,000 lb. per acre on an average, is the rule under ordinary conditions of manuring on lands of average fertility.

(Madras Agrl. News Letter, April 1955) [A. M. K.]

Cumbu (P. T. 833) A high yielding selection of Cumbu P. T. 833 maturing in about 80 days had been sent out for trial in the southern districts. From the results received it is found to be consistently high yielding in most of the centres tried. From the reports received it is noted that this selection gave as much as 32 percent more yield than the local variety in Mudukulathur taluk in Ramanathapuram district. (Madras Agrl. News Letter, April 1955) [A. M. K.]

Digestibility of Cow's Milk and Buffaloe's Milk: Two research workers of Food in an University in Giza, Egypt, have reported results on the comparative digestibility of cow's milk and buffaloe's milk. They used sheep as test animals. The final average data for digestibility of the different constituents of both types of milk were as follows :—

Co-efficient of digestibility	Dry Matter Per Cent	Protein Per Cent	Fat Per Cent
Cow's milk ..	79·21	83·18	97·07
Buffaloe's milk ..	77·04	83·87	97·62

From these results, it can be concluded that the digestibility co-efficients of different constituents of buffalo's milk are practically equal to those of cow's milk. As regards protein digestibility, the results were verified by a separate experiment using pepsin and hydrochloric acid when it was 95·01 for cow's milk and 94·47 per cent for buffaloe's milk. It seems, therefore, that the relatively higher amounts of fat in buffaloe's milk did not affect the digestibility of proteins and fats. In the opinion of these workers the idea of medical men that cow's milk is preferable to buffaloe's milk has no physiological basis. [A. M. K.]

How Legitimate are Names on Scientific Papers: Are names on technical papers a perversion of the ideal of selfish devotion to Science?

A man scrambles to get his name on paper. Getting promoted depends on the number of papers yon have published. Either get papers out or get out. The man who scrambles to get his name in print, has a living to make. Though he did not make this system, he has to live by it. It is all a part of the present

competitive system and spirit, now being applied to Science, no less than to business and industry.

Science as practised to-day would be impossible without the wholesale exchange of ideas and theories, facts and figures brought out by individuals and teamwork and materials picked up from the literature. The contribution of Einstein, Bohu, Dirah, Heisenberg, Born and Planck lies to a great extent on the work going around them and in these men giving a new twist or in integrating into a unified system, a heterogenous mass of Scientific material. To over emphasise the importance of their work is to belittle the achievements of all competent Scientists.

The true scientific spirit must be the desire to pass along what has been discovered and worked out. There is nothing inherently discreditable in getting one's names appearing on papers. But the mad scramble for credit by rushing up to get names on papers cannot be said to be scientific spirit. (Science Vol. 120, 276, 1954) [D. D. S.]

Planting Cardamoms — Higher Yields with Longer Rhizomes: Using longer rhizomes for planting increases cardamom yields, experiments at the Cardamom Research Station at Singampatti have shown. Planters generally do not use sufficiently long rhizomes for planting. For the experiments, the planting of mother rhizomes eight inches long was compared with the planting of short ones of an inch in length. With the same care given to both, it was found that where long rhizomes were planted, the crop began bearing about six months earlier and gave an increase in yield of cardamom.

(I. C. A. R. Farm News Release No. 47)

Double Rows for Potatoes — New System of Planting: Planting potato tubers at one inch depth from the soil surface in two rows six inches apart on the ridge is getting popular with farmers in the Punjab. The system, recently evolved, consists of growing two rows of potatoes on ridges 2¼ ft. to 2½ ft. apart, instead of a single row on ridges 1½ ft. to 2 ft. apart as is the practice. The bigger spacing makes cultural practices easier, economises irrigation water and cuts labour costs of interculture and harvest. After planting the seed tubers in double rows on the ridge, it is recommended that fertilizer is applied in a band in the middle of the rows, an inch deeper than the seed. Similarly, fertilizer is also applied in bands two inches away from each row on the outer sides of the ridge. The seed and the fertilizer are later covered with two or three inches of earth taken from the outer side of the ridge to make one ridge over the two rows of seed potatoes. The new system, it is claimed, increases the returns from the potato crop.

(I. C. A. R. Farm News Release No. 48)

Vitamin-Rich Milk — Giving Shark Liver Oil to Cows: Milch Cows and buffaloes produce milk rich in vitamin A, if shark liver oil is included in the daily feed, research has shown. Cows get vitamin A in the form of carotene through green fodder. To assure that vitamin A rich in milk be produced even in the season when green fodder is not available, feeding shark liver oil is recommended. Cows and buffaloes fed with ten grams of shark liver oil per day per head along with dry roughage during the dry fodder period gave milk rich in vitamin content, experiment showed. The flavour of the oil was not noticed in the mil produced. (I. C. A. R. Farm News Release No. 4

Better Vegetables — Prepare the Seed-Bed Well: Experiments in resea stations show that very good crops of Vegetables can be obtained if the seed-

is properly prepared. A well sifted mixture of four parts each of sandy soil and leaf mould and one part of well-rotten farm manure has been found to be the best for the seed-bed. If sowing has to be done on the ground, make small beds raised a few inches above ground level. This will provide a good drainage. Before sowing, water the beds thoroughly to make the soil settle down firmly. Work up the topsoil for one or two inches after two or three days and then sow the bed. In sowing, it is advisable to sow in two or three lots rather than one. This will ensure a uniform supply of fresh vegetables. Avoid thick sowings. The depth of sowing depends upon seed and type of soil. As a general rule, the covering should be three to five times the diameter of the seed. The sowing should be a little deeper in heavy soils. (I. C. A. R. Farm News Release No. 45)

Early Blight of Potatoes — Timely Spraying Recommended: In the plains of northern India, where the bulk of potato is cultivated blight disease makes its appearance from time to time. The disease occurs late in the season so that the early planted main crop is not affected. Affected plants show brown spots with concentric rings on the leaves. The spots enlarge and merge together, killing the entire leaf. Yields get reduced whenever there is blight disease attack. Timely spraying with Bordeaux mixture 'Perenox' or 'Diathane D-14' has been found to effectively control the disease and is being recommended to all potato growers.

(I. C. A. R. Farm News Release No. 46)

Controlling the Sugarcane Root Borer — Method of Harvest Helps: The practice of harvesting sugarcane by digging it out has not only been found to add to the total yield, but also found to keep down the root borer attack to a great extent. The root borer, a common sugarcane pest, severely damages the cane crop in the early stages. The central shoot dries up and shows a greyish white colour. When damages is serious, the crop is lost. Where digging out the cane crop is not practicable, the cane should be harvested by cutting it as close to the ground as possible. The stubbles left in the field should be removed and destroyed so as to kill the borer hiding in them. Wherever the pest is serious, agricultural experts also advise that farmers discontinue raising the ratoon crop.

(I. C. A. R. Farm News Release No. 50)

Compost is a Good Manure — Snpplement it with Fertilizers for Good Results: Compost, whether produced on the farm or brought in from town depots. is a good organic manure, and is best applied to the soil at the time of preparatory cultivation The dose of the manure to be applied to the fields varies with the intensity of cultivation, but, generally, ten to twenty cartloads (one cartload is equal to about 1,000 lb. of manure) are found to be adequate per acre of irrigated land. Where rainfall is between 20 and 50 in., four to eight cartloads per acre have been prescribed, and when it is less than 20 in., two cartloads have been fonnd sufficient. Compost manure is rich in organic matter, but it is poor in nitrogen, phosphoric acid and potash. Farmers are advised to supplement it, wherever necessary, with nitrogenous and phosphatic fertilizers. Where intensively cultivated crops like vegetables, potatoes, rice or sugarcane are grown, it is profitable to use nitrogenous supplements, such as ammonium sulphate or oilcake. Compost manure supplemented with extra nitrogen, phosphate and potash gives good results for such fruits as banana, citrus and mango. (I. C. A. R. Farm News Release No. 51)

Feeding Chickens — Protein-Rich Food Essential: Proteins are essential for young growing chickens. Poultry specialists point out that unless chickens are fed with protein-rich food they do not make satisfactory growth. As cereals are some what deficient in proteins, special foods rich in proteins should be given.

Separated milk or buttermilk solves this problem. If chickens are given either of these in place of water, there would be no need to look for other protein foods. Meat offal (intestines of animals from the slaughter-house) also gives excellent results. The meat offal should be chopped and cooked for an hour before it is fed with the mash. Feed chickens with ample cut green food every day from one week onwards, and also limestone grit or oyster-shell from two days onwards for getting good results. (I. C. A. R. Farm News Release No. 52)

Efficient Poultry Feed — 1·64 lbs. feed per lb. gain: University of Maryland scientists have evolved a high powered ration which makes it possible to save three pounds of feed in producing a three pound broiler chickens. They can raise this bird in just 52 days using only 1·64 pounds of feed per pound of gain. Most good U. S. chicken farmers average around 2·75 pounds of feed per pound of gain. The key to the remarkable efficiency of the new ration lies in a new balance between 'energy' feeds such as corn, and feed such as bean type meals and cereals, which have a high protein content. The scientists found that it was neither "high energy" nor high protein that made a food efficient, but plenty of each. The important thing, they discovered, was to have enough "energy" or calories in proportion to the percentage of protein. Chickens fed protein rations without sufficient "energy" feed overeat and waste energy, the scientists found, whereas "energy" feeds are wasted when birds eat "high energy" low protein rations. The perfect chick starter mash, they discovered, ought to have 42 calories of usuable "energy" for each one per cent of protein per pound of ration to produce the greatest growth. A finishing ration should have 47 calories for each one per cent of protein. This means 860 calories per pound of 20 per cent protein and 940 calories per pound of 23·5 per cent protein food or the reverse of what is found in most commercial feeds used in the U. S. In other words, according to the Maryland discoveries, commercial feeds are causing birds to over-eat either the "energy" or protein feeds. Credit for this discovery and the benefits that will stem from it go to Dr. Gerald Combs, Dr. G. Lynn Romoser and Dr. William Supplee of the University of Maryland Poultry Husbandry Department.

(Planters Journal, May 1955) [A. M. K.]

Gamma Rays for insect control: Considerable possibilities are seen in the use of ray and atomic radiation for controlling insects by interfering with their reproductive capacity. Dr. E. P. Kipling sterlised the males of the screw worms affecting domestic animals with gamma rays. 40,00,000 of these males were introduced in the island of curacas in West Indies. Since the female mates only once within two years of the introduction, the population of the screw worms was brought down almost to zero. The same procedure is now being attempted for the pinkboll worm of cotton. Encouraging results have already been obtained in the use of the gamma rays to keep the insects from reproducing Dr. F. C. Bishopp says that it may prove practical particularly when the insects occur in small numbers or when the female mates only once. Experiments are in progress also for testing these rays for the control of the insect in the field and insects in stores. Portable equipment for being taken to the field are being developed. (Planters Journal and Agriculturist XLVII No. 5. 1955.) (S. K. D).

Weather Review — For the month of April, 1955.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January	Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam)	1·9	+ 1·3	6·6	South	Madurai	4·3	+ 2·1	5·1
	Tirurkuppam*	1·6	+ 0·5	6·5		Pamban	7·0	+ 5·2	13·1
	Vellore	0·7	— 0·3	2·5		Koilpatti*	3·0	— 0·6	8·0
	Gudiyatham*	0·6	— 0·3	2·4		Palayamcottai	6·8	+ 4·3	8·9
East Coast	Palur*	4·8	+ 3·8	7·4		Ambasamudram*	5·0	+ 1·2	11·3
	Tindivanam*	2·1	+ 1·1	2·6	West Coast	Trivandrum	2·9	— 1·7	5·9
	Cuddalore	3·6	+ 2·6	5·6		Fort Cochin	6·4	+ 1·5	8·1
	Nagapattinam	4·8	+ 3·7	8·2		Pattambi*	5·1	+ 1·9	5·2
	Aduturai*	4·3	+ 3·3	5·8		Kozhikode	6·9	+ 2·0	7·9
	Pattukottai*	2·7	— 0·1	5·9		Taliparamba*	1·3	— 1·1	1·8
Central	Salem	2·8	+ 0·9	4·3		Wynaad*	5·8	+ 0·8	9·3
	Coimbatore (A. M. O.)*	2·9	+ 1·0	3·3		Nileshwar*	2·8	+ 0·1	3·0
	Coimbatore	4·4	+ 2·8	4·9		Pilicode*	2·8	— 0·3	2·8
	Tiruchirapalli	4·1	+ 1·7	5·0		Mangalore	0·9	— 1·0	0·9
						Kankanady*	1·2	— 0·8	1·2
					Hills	Kodaikanal	14·0	+ 9·2	18·3
						Coonoor*	5·2	— 0·9	12·1
						Ootacamund*	5·5	+ 0·7	7·4
						Nanjanad*	3·9	— 1·2	5·6

Note:— * Meteorological Stations of the Madras Agric. Dept.

The month began with thundershowers at a few places in interior Tamilnad. The weather was practically dry in the succeeding five days. Again, on 7—4—1955 localised thundershowers were received in south Tamilnad. Weather in the subsequent six days was characterised by isolated light thundershowers in some part or other of Tamilnad and also in Travancore-Cochin, Mysore and along the West Coast. The weather became dry on 14—4—1955 and remained so for three days with the exception of light showers in Palni hills.

The high grounds of interior Tamilnad received scattered showers on 17—4—1955. In the subsequent two days thundershowers were localised in south Tamilnad and Travancore-Cochin. On 20—4—1955 practically the entire Tamilnad and Travancore-Cochin received a sort of general rain and this type of widespread rain and cloudy weather persisted till 25—4—1955. The weather became dry on 26—4—1955. In the last four days of the month localised light showers were received in Travancore-Cochin and at a few places in Tamilnad and Malabar and South Kanara districts.

The major portion of the Madras State had good summer showers in April, 1955. Agriculturally these rains had good effect on the standing crops like groundnut, cholam, ragi, etc. Further, they improved considerably the water position in the wells.

The note-worthy rainfalls and the zonal rainfall in inches are furnished hereunder :—

Note-worthy Rainfalls			Zonal Rainfall			
Date	Name of Place	Rain-fall	Name of Zone	Av. rainfall for April, 1955	Dep. from normal	Remarks
10/4/55	Ootacamund	3·0	North	1·2	+ 0·3	Above normal
13/4/55	Kozhikode	4·0	East Coast	3·7	+ 2·4	Far above normal
13/4/55	Cochin	3·0	Central	3·6	+ 1·6	Above normal
20/4/55	Pamban	3·0	South	5·2	+ 2·4	do.
20/4/55	Nagapattinam	3·0	West Coast	3·6	+ 0·1	Normal
21/4/55	Kodaikanal	5·0	Hills	7·2	+ 2·0	Above normal
21/4/55	Cuddalore	2·5				
23/4/55	Mathurai	2·0				
25/4/55	Alleppey	3·0				

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 11—5—1955.

C. B. M. & M. V. J.

DEPARTMENTAL NOTIFICATIONS

Postings and Transfers

Name and Present Post	Posted as
Anantapadmanabha Pillai, Principal, Grama Sevak Centre, Bhavanisagar,	Spl. D. A. O., Crop Sampling, Tanjore.
Kalyana Sundaram, N. V., Spdt. A. R. S., Bhavanisagar,	D. A. O., Madurai.
Rayappa Pillai, M. On leave,	Supdt. A. R. S., Bhavanisager.
Venkatakrishnan, G., On leave,	D. A. O., Salem.
Ahmad Bavappa, K. V., Asst. in Paddy, Aduturai,	Paddy Asst., Mangalore.

Name and Present Post	Posted as
Achutha Nair, E. P., P. A., Tellichery,	P. A., to D. A. O., Tellichery.
Annaswami, B., A. D., Srivaikuntam,	P. A., to D. A. O., Tirunelveli.
Balakrishna Alwa., P. P. A., Tellichery,	A. D., Kunhangod.
Balasubramaniam, M., A. D., Gudimangalam,	A. D., Peruvalappur.
Balasubramaniam, K. R., S. D. A., Tanjore,	A. D., Chingleput.
Govindan Nair, K. V., Instructor Agrl. Basic Training, Taliparamba,	A. D., Cananore.
James, K. I., Cotton Asst., Coimbatore,	Cotton Asst., Pattambi.
Kannan Nambiar, P., A. D., Cananore,	A. D., Badagara.
Kalyana Raman, A. V., Ex. Officer, Tiruvellore,	A. D., Namakkal.
Navaneethakrishnan, T. V., P. P. A., Tanjore,	P. P. A., Pattukottai.
Nagarajan, V., A. D., Conjeevaram,	A. D., Tirumani.
Oblichetty, T. V., Sugarcane Asst., Gudiyattam,	Cane Asst., Palur.
Perumal, K. P., P. A., Tirunelveli,	P. P. A., Madurai.
Ramachandran, K. V., A. D., Badagara,	Instructor, Agrl. Basic Training, Taliparamba.
Ratnasabapathy, A. D., Pattukottai,	A. D., Varagoor.
Sivaraman, S. S., Spl., A. D., Coimbatore,	P. P. A., Tanjore.
Sundaresan, K. R., (On leave)	Sugarcane Asst., Gudiyattam.
Sethumadhavan, K., Spl. A. D., Palghat,	Spl. A. D., Laccadive and Amindivi, Islands.
Samu Iyer, P. V., Spl., A. D., Nillakottai,	A. D., Conjeevaram.
Thanickachalam, T. K., A. D., Tirukoilur,	A. D., Cuddalore.
Venugopal, K., P. P. A., Pattukottai,	Spl. A. D., Sugarcane, Coimbatore.
Vaidyanathan, S., Sugarcane Asst., Gudiyattam,	Cane Asst., Palur.
Vijayaraghavan, A. P., A. D., Taliparamba,	P. P. A., Tellichery.
Venkatachalam, T., A. D., Peruvallappur,	A. D., Gudimangalam.

Supplement to The Madras Agricultural Journal.

DISTRICTS
S. ARCOT ; COIMBATORE
MALABAR, S KANARA
RAMANATHAPURAM
TIRUNELVELI
NORTH ARCOT

MARKET COMMITTEES CHRONICLE
DEVOTED TO
A FACTUAL RECORD OF
SERVICE FOR REGULATED MARKETING

CROPS
COTTON, GINGELLY
GROUNDNUT
COCONUT
ARECANUT
TOBACCO

Review of Market Conditions for Commercial Crops in the Areas of Market Committees (April, 1955)

I. **Cotton:** (In this Section Candy = 784 lb., Bale = 392 lb., Pothie = 280 lb.) The lint market at Tirupur was active this month with brisk arrivals and transactions. On 26—3—1955 there was a market stock of 4,845 candies cambodia and 1,221 candies Karunganni lint at Tirupur. Arrivals upto 30—4—1955 amounted to 19,668 (Cambodia 16,867, Karunganni 2,801) candies as against 5,023 candies in the previous month (Cambodia 4,570; Karunganni 453). The arrivals for April included 10,750 (Cambodia 8,724; Karunganni 2,026) candies of lint locally ginned at Tirupur from Kapas assembled there and 1,060 bales imported from other areas. Disposals of cotton for the same period were 16,962 candies (cambodia 14,569; Karunganni 2,393) including 2,627 bales despatched to places outside Coimbatore district. The month end stocks were 11,557 (cambodia 9,902; Karunganni 1,755) candies.

In the kapas market at Tirupur there was an opening stock of 25,615 (Cambodia 22,795; Karunganni 2,820) pothies. Fresh arrivals amounted to 33,616 pothies from other centres. Disposals, including stock issued for ginning of Tirupur amounted to 22,384 pothies (Cambodia 20,470; Karunganni 1,914) leaving at the end of April, 55 a stock of 36,847 pothies (Cambodia 30,942; Karunganni 5,905).

The flow of kapas into the market at Koilpati was in full swing with receipts upto 13,232 pothies. Local mills were active buyers in the market.

In the three markets of Virudhunagar, Rajapalayam and Sattur together there were 2,920 pothies of Karunganni Kapas at the commencement of the month; 32,216 pothies (Karunganni 31,120 pothies;

Cambodia 1,096 pothies) of kapas were received and 31,896 pothies (Cambodia alone 1,016 pothies) were sold leaving a month end stock of 3,240 pothies (Cambodia alone 80 pothies) Kapas.

Prices of Cambodia lint at Tirupur opened at Rs. 880/- per candy and after a decline to Rs. 860/- on 23—4—1955. At Virudhunagar cambodia lint maintained a steady price of Rs. 720/- for the best quality and Rs. 696/- for the poorer quality. The price of cambodia kapas started at Rs. 107/- per pothi at Tirupur and rose steadily to Rs. 110/- by the middle of this month to close stronger at Rs. 112/- at the end. At Virudhunagar the Kapas also maintained a steady tone between Rs. 70—11—0 to Rs. 84—6—0 according to quality throughout the month. Madras Uganda lint at Virudhunagar marked a slight decline in prices from Rs. 1,100/- to Rs. 1,050 per candy between the commencement and end of the month.

Prices for Karunganni lint at Tirupur after being steady at Rs. 711/- per candy till the middle of the month declined slightly to Rs. 701/- on the last day of the month. At Virudhunagar the price for the first quality Karunganni lint fluctuated between Rs. 656/- to Rs. 691/- with a steadily increasing under tone. The top prices as between different qualities ranged between Rs. 616/- and Rs. 691/-. The lint market for karunganni at Koilpatti was in a declining trend from Rs. 680/- down to Rs. 660/- for the I quality and Rs. 650/- to Rs. 620/- for the II quality. 1·7 the prices for karunganni kapas were oscillating within narrow margins between Rs. 80/- to Rs. 83/- per pothi at Tirupur and Rs. 74/- to Rs. 76/- for the best qualities at Virudhunagar. At Koilpatti however, a steadily gaining trend from Rs. 74—12—0 upto Rs. 81—8—0 for the best quality was registered.

The Market for cotton seed (Karunganni) at Koilpatti was steadily declining from Rs. 21/- per pothie down to Rs. 20/- at the close of the month after a steadiness at Rs. 20—8—0 during the middle of the month for two weeks. Karunganni seeds at Virudhunagar were steady at Rs. 20/- upto the middle after a spurt to Rs. 21—2—0 in the third week came down to Rs. 18—11—0 towards the end of the month. The price of Cambodia seeds however ruled steady at Rs. 16—10—0 per pothie throughout the month.

Prospects of good flush are held out at all centres.

II. **Groundnut**: In this Section candy = 531 lb. Bag = 80 lb.)

Arrivals of groundnut kernel in the eight regulated markets of South Arcot were declining. The total quantity accounted for was 1,551 tons of which Vridhachalam alone accounted for 509 tons closely followed by 468 tons at Tindivanam and 301 tons at Tirukoilur. About 350 tons were received at Tiruvannamalai in North Arcot District while arrivals in the other markets were trivial.

The average of prices for the kernels for the whole month as between the different markets in South Arcot ranged from Rs. 84—8—0 per candy at Villupuram upto Rs. 93—3—0 at Vridhachalam. A steady tone was maintained from week to week except for a little sagging in the third week. The kernels market in the centres of North Arcot were featureless with buyers luke-warm and overseas indications lacking in buoyancy. In this district large quantities are also reported to be held back by the growers. The prices were steady between the levels of Rs. 85/- to 94/- per candy from week to week. The price of pods indicated a slight decline from the range of Rs. 9/- to Rs. 11/- at the commencement down to Rs. 8—8—0 to Rs. 9/- per bag at the end of the month, the decline setting in during the third week. The Virudhunagar prices for kernels were steady between Rs. 98 to Rs. 105/- per candy with but a slightly firm tone at the higher levels in the second and third week.

III. **Gingelly:** (Bag in this section = 2 maunds each of 82 2/7 lb). The arrivals of gingelly in five regulated markets of South Arcot were also in a declining trend. The total quantity accounted for was 1338 bags of which the share of Vridhachalam alone was 1197 bags. Prices ruled easy between Rs. 35/- and Rs. 37—5—0 per gag — the top price being accounted fer by Vridhachalam the biggest gingelly market in South Arcot. At this market the prices gained by nine annas per bag to Rs. 38/- in the second week declined by 4 annas in the third week and registered a further sharp decline to Rs. 36—2—0 in the last week.

IV. **Coconut:** (Candy in this Section = 700 lb and Bag = 100 lb). Four markets in Malabar had an opening stock of 5·7 million nuts and 6·5 million nuts were received in the course of the month. Disposals out of these amounted to 7·5 million leaving a closing stock ef 4·7 million nuts. Out of the disposals 7·2 million nuts were despatched to other states and districts within the State. Arrivals were heavy and there was good offtake by Bombay. Prices ruled steady between Rs. 105/- and Rs. 138/- per 1,000 nuts in the Malabar markets and between Rs. 135/- to Rs. 160/- for the raw nuts and Rs. 160/- and Rs. 190/- for the dry nuts at Mangalore.

In the copra markets of Kozhikode and Badagara the opening stocks for the month were 2,615 candies. Arrivals were heavy being 5,546 candies. Demand from millers was good. The total disposals amounted to 4,927 candies of which 3582 candies were despatched to other centres outside Malabar. The month end stocks were 3,234 candies. The prices of copra maintained a steady tone. The fluctuations as between the different varieties and from market to market are shown below :—

Variety		Rupees per candy Max.	Min.
Office	...	282	262
Edible	...	295	285
Rajapur	...	430	425
Madras	...	400	370

At Mangalore the prices revealed a slight gaining trend with fluctuations remaining between Rs. 265/- and Rs. 300/- per candy.

V. **Arecanuts**: The supari stock at Mangalore opened with 1,0628 cwt. and 25,500 cwt. were added to it from the currant arrivals. Disposals and exports took away 25,777 cwt. leaving 10,351 cwt. as the closing stock for the month. The price of supari marked a slight downward trend during the first half of the month but assumed firmness later with good demand from Bombay. The range in prices for the different grades are given below:—

Mangalore Supari	...	Rs. 135/- to Rs. 170/-
Malabar Supari	...	Rs. 125/- to Rs. 150/-
Koka	...	Rs. 90/- to Rs. 115/-

Sliced arecanuts (choor) at Kozhikode and Ponnani Markets of Malabar held in stock at the commencement of the month were 643 bags (each 100 lb). At Ponnani alone 220 bags were received. In both the markets together 208 bags were sold of which 158 bags were despatched to other centres outside Malabar. The stock held at the end of the month were 655 bags. The prices ranged from Rs. 170/- to Rs. 185/- per cwt.

VI. **Tobacco**: Tobacco stocks in Coimbatore district were 7,947 candies (each 500 lb.) of chewing types and 1,402 condies of Cheroot tobacco. Out of the former 1,346 candies and 804 candies out of the latter were despatched outside the district, chiefly to Pudukottai, Malabar (Palghat) Travancore-Cochin State (Quilon) and Ramanathapuram. Prices remained steady at the levels as in the previous month and the ranges are indicated below —

Variety		Per candy of 500 lb. I grade	II grade	III grade
1. *Chewing Tobacco Sub cured*:				
(a) Meenampalayam	...	450 to 500	330 to 450	220 to 280
(b) Other varietres	...	400 to 425	250 to 300	175 to 225
2. *Cheroot varieties*:				
Sun cured (grown in Erode and Bhavani Taluks)	...	200 to 240	140 to 180	100 to 120
3. *Chewing varieties*:				
Pit cured (grown in Palladam and Sulur areas)	...	200 to 220	120 to 150	80 to 95

Activities of the Market Committees During the Month of April, 1955

Of the Seven Market Committees in the State five in the districts of North Arcot, South Arcot, Coimbatore, Malabar and South Kanara were actively functioning. The activities of the Committees in the districts of Ramanathapuram and Tirunelveli continued to be restrained as per the injunction order of the High Court.

The following progress was made by the Market Committees during the month in the issue of licences under Section 5 of the Madras Commercial Crop Markets Act.

Commodities	Sec. 5 (1)		Sec. 5 (3)		Weighmen		Broker	
	A	B	A	B	A	B	A	B
North Arcot Market Committee ...	—	542	—	262	—	268	—	7
South Arcot Market Committee ...	159	1,005	179	1,171	41	443	1	3
Tirunelveli Market Committee ...	—	36	—	15	—	17	—	—
South Kanara Market Committee ...	46	180	40	153	15	33	—	38
Malabar Market Committee ...	—	86	180	—	132	132	—	9

A — During the month. B — Upto the end of the month.

The total of transactions in commercial crops in the thirteen regulated markets in the districts of South Arcot, North Arcot and Coimbatore during April, 1955 is extracted below :—

Crop	Quantity	No. of Regulated Markets
Groundnut kernels ...	2,045 tons	9
Gingelly seeds ...	1,769 tons	5
Cotton lint ...	3,076 candies	1
Cotton kapas ...	17,444 pothies	1

(Candy = 784 lb. Pothi = 280 lb.)

II. **Meetings**: The Malabar Market Committee held an urgent Meeting on 25—4—1955, while there was no meeting of the South Arcot Market Committee during the month. The other committees are functioning under the respective District Collectors under Section 6-A of the Madras Commercial Crop Markets Act.

III. **Special features:** The Chief Minister of Madras paid a visit to the Malabar Market Committee at Kozhikode during his visit to Malabar on 25—4—1955 when he was presented with an address of welcome by Chairman on behalf of the Committee. The Chief Minister felt glad that the Committee was functioning smoothly without any party rivalries and that it is working for the benefit of the Growers in securing a fair price for their produce. He promised to consider a few points raised in the address presented and see what is possible is done.

IV. **Quality appraisal:** The South Arcot Market Committee continued its work on the quality appraisal of the Groundnut kernels marketed in five of its Regulated Markets on the basis of random sampling. A total of 538 samples of groundnut kernels was drawn from the arrivals into five Ragulated Markets from 3,965 lots comprising 1,545 tons and were analysed.

CROP AND TRADE REPORTS

Tobacco-First Forecast Report-1954—'55-Madras State: The area sown with tobacco upto 25th December, 1954 is estimated at 42,000 acres. Compared with the area of 41,100 acres estimated for the corresponding period of last year, it shows an increase of of 4 7 per cent. Comparod with the average area of 38,500 acres for the five years ending with 1953-54, this is an increase of 9·1 percent. The increase in area this year is due to adequate rains at the time of ploughing. The area estimated is the same as that of last year in the districts of North Arcot, Tiruchirapalli, Tanjore, Madurai and Tirunelveli. An increase in area is estimated in the districts of South Arcot, Salem, Coimbatore, Ramanathapuram and South Kanara and the area is little or negligible in the other districts of the State. The condition of the crops is reported to be generally satisfactory in all the districts of the State. The yield per acre is expected to be normal in all the districts of the State except in North Arcot, Madurai and Tirunelveli where it is too early to report on the yield of the Crop. The wholesale price of tobacco per maund of 82 2/7 lbs. or 3,200 tolas as reported from important market centers on 8—1—1955 was Rs. 39—7—0 in Erode compared with the price which prevailed on 9—1—1954 this price reveals an increase of 0 2 per cent.

Paddy-Third or Final Forecast Report 1954—55-Madras State: The total area sown with paddy in 1954-55 in the Madras State is estimated at 64,28,000 acres. Compared with the area of 64,25,000 acres according to the provisional figures as per the Season and Crop Report for the previous year, the present estimate reveals a slight increase of about 0·03 per cent. As compared with the

average area of 58,67,000 acres calculated for the five years ended 1953-54, the current year's estimate shows an increase of 9·6 per cent. Attacks by pests have been reported in parts of Chingleput, South Arcot, North Arcot, Tiruchirapalli, Tanjore, Tirunelveli and Ramanathapuram districts. Heavy losses were averted by timely preventive measures taken by the Agricultural Department. Rains in December '54 and in subsequent months also improved the condition of the crop affected by pests. The condition of the standing crop is reported to be generally fair except in parts of Coimbatore, Ramanathapuram, North Arcot and non-Periyar area of Madurai District.

The Seasonal Factor for the State as a whole works out to 97 per cent of the normal for the first crop, 94 per cent for the second and third crops, as against 94 per cent, 93 per cent and 92 per cent respectively estimated for the previous year. On this basis, the total yield of rice is estimated at 30,96,000 tons. Compared with the estimate of 30,67,000 tons for the previous year according to the provisional figures as per the Season and Crop Report, the present estimate shows an increas of 0·9 per cent. As compared with the average yield of 24,00,000 tons calculated for the five years ended 1953-54, the current year's estimate is an increase of 29·0 per cent. The wholesale price of Paddy II Sort, per standard maund of 82 2/7 lb. (equivalent to 3,200 tolas) as reported from some important centres for the week ending 12—2—'55 was Rs. 7—14—0 at Cuddalore, Rs. 8—4—0 at Vellore, Rs. 8—8—0 at Tanjore, Rs. 9—3—0 at Madurai and Rs. 9—6—0 at Tiruchirapalli compared with the prices which prevailed during the corresponding period of the previous year, the current prices reveal a fall of 8·7 per cent at Tanjore, 9·3 per cent at Madurai, 14·3 per cent at Cuddalore, 28·3 per cent at Vellore and rise of 2·7 per cent at Tiruchirapalli.

Cholam (Jower) 1954—'55-Second Forcast Report-Madras State: The area sown with Cholam (Jowar) or Sorghum Vulgare) in the Madras State upto the end of December, 1954 is estimated at 14,93,300 acres. Compared with the estimated area of 14,70,100 acres for the corresponding period of the previous year, this is an increase of 1·6 per cent. The early sown crop has been harvested in the districts of Chingleput, South Arcot, Madurai and Ramanathapuram. The yield per acre is expected to be normal in Tanjore district and slightly below normal in the other districts of the State except South Kanara where the crop is not grown. The condition factor for the State as a whole works out to 96 per cent of the normal as against 97 per cent in the previous year. On this basis, the total yield works out to 4,82,000 tons of unhusked grain or 4,09,700 tons in terms of cleaned grain as against 4,80,800 tons of unhusked grain or 4,08,700 tons in terms of cleaned grain estimated for the corresponding period of the previus year, representing an increase of 0·2 per cent. The average wholesale price of Cholam per standard maund of 82 2/7 lb. (equivalent to 3,200 tolas) as reported from certain important market centres on 22—1—55 was Rs. 9—14—0 at Tiruchirapalli, Rs. 9—5—0 at Tiruppur and Rs. 8—10—0 at Salem.

Pepper-Third and Final Forcast Report-1954—'55-Madras State: The area under pepper in 1954-55 in the districts of Malabar, South Kanara and the Nilgiris is estimated at 1,19,650 acres (1,02,000 acres in Malabar district, 17,500 acres in South Kanara District and 150 acres in the Nilgiris District). Compared with the actual area of 1,18,830 acres (1,01,490 acres in Malabar District, 17,190 acres in South Kanara District and 150 acres in the Nilgiris District) for the previous year, the present estimate shows an increase of 0·7 percent. Compared with the average area of 1,10,160 acres (94,890 acres in Malabar District, 15,140 acres in South Kanara District and 130 acres in the Nilgiris District) calculated for the previous five years ending 1953-54, the present estimate shows an increase of 8·6

percent. The condition of the crop is reported to be below the normal in the districts of Malabar and South Kanara. The seasanal factor is estimated at 90% of the normal for the district of Malabar, 75% of the normal for the district of South Kanara; and normal for the district of the Nilgiris, as against 90% of the normal for the districts of Malabar and South Kanara and 85% of the normal for the district of the Nilgiris estimated for the previous year. On this basis, the yield is estimated at 8,870 tons of black pepper (7,750 tons in Malabar District, 1,110 tons in South Kanara District and 10 tons in the Nilgiris District). Compared with the yield of 9,030 tons of black pepper (7,710 tons in Malabar District, 1,310 tons in South Kanara District and 10 tons in the Nilgiris District) estimated for previous year, the present estimate shows a decrease of 1·8 percent. Compared with the average yield of 8,190 tons (7,020 tons in Malabar District, 1,160 tons in South Kanara District and 10 tons in the Nilgiris District) calculated for the previous five years ending with 1953—'54, the current year's estimate reveals an increase of 8·3 percent.

The wholesale price of black pepper per standard maund of 82-2/7 lb, or 3,200 tolas as reported from important market centres on 12—3—1955 was Rs. 122—7—0 in Cochin, Rs. 121—4—0 in Mangalore, Rs. 118—7—0 in Tellicherry for Wynaad and Vatakkan varieties, Rs. 112—4—0 for Nadan variety, Rs. 117—8—0 in Kozikode or Wynaad variety, Rs. 105—13—0 for Vatakkan and Nadan varieties. Compared with the prices which prevailed in the corresponding period of last year i. e. on 13—3—54, these prices reveal a decrease of 64·3 percent for Vatakkan and Nadan varieties in Kozhikode 62·4 percent for Wynaad variety in Kozhikode, 45·0 percent Mangalore and 41·2 percent in Cochin.

Mesta-Madras State-1954—'55-Supplementary Forecast Report: The area sown with mesta (Hibiscus Cannabicus) in the Madras State during 1954—'55 is estimated at 1,310 acres. Compared with the area of 1,470 acres estimated for 1953—'54 this is a decrease of 10·9. The crop is mainly grown in the district of Coimbatore. An increase in area is estimated in the districts of North Arcot, Tiruchirapalli, Madurai and Tirunelveli and a decrease in the district of Coimbatore. The area in the current year is the same as that of last year in Tanjore.

The yield per acre is estimated to be below normal in the districts of North Arcot, Madurai and Tirunelveli and normal in other districts. The seasonal factor for the State works out to 99 per cent of the normal which is the same as that for the previous year. On this basis the total yield in terms of fibre works out to 2,420 bales of 400 lbs. as against 2,740 bales estimated for the previous year representing a fall of 11·7 per cent.

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Life span and our diet: The Royal jelly, the wonder elexir prepared by honey bees to assure the longevity of their queen bee was discussed at the last meeting of the French Scientific Society for nutrition in Paris. Though the researchers were not yet sure of its value in human nutrition and its potentiality to increase the span of life, the imagination of the public caught on to this new elixir of life and many a commercial firm made capital out of it. While this is still in the realm of speculation which future research alone would set at rest, we have many concrete results achieved in our dietary needs by scientists of the day. Consequently, according to Sebrell of the United States National Institute of Health, the life expectancy beyond the fiftieth year has gone up to 22 percent in 1950 from 13 percent in 1900 and may be 24 percent in 1960. Nutritional research has given a very fruitful approach to this problem of increasing our life span and also to keep ourselves in good health all the time.

Credit for this achievement must go to the inte studies made in accessory nutrients like the vitamin minerals. To this has lately been added the anti which have become more nutrient materials tha original role of bacteriostatic agents.

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rice, rich in proteins, which was produced and standardised four years back at the Central Food Technological Research Institute, Mysore. This is made by processing groundnut cake with tapioca flour. Inspite of all these substitutes devised by our scientists very few have taken to these alternate sources of food. Dr. McCarrison while at the helm of affairs at the Coonoor Nutritional Institute had shown some thirty years ago that the rice eater of South India has need to supplement his rice with enough milk, pulses, green leaf vegetables and fruit to live in good health. During these thirty years our economic condition has not risen to the stage when we can afford all the aforesaid food materials to supplement adequately cur requirements.

Even our net calorific requirement per capita remains nearly 600 to 1,000 calories lower than the average requirement. This is, therefore, the cause which motivates our scientists to present ways and means of adjusting our dietary set up to tide over the inadequecies of our present food. But this at the most is only a make-shift arrangement and our main objective should be to attain the real articles of food as recommended by McCarrison instead of living on substitutes. The sooner we tide over this reign of substitute food materials the better it will be for the Nation and for the expectancy of our people. And the solution is in the hands of our Farmers and Dairymen who should strive to get more and more out of the land and the cow to supply enough protein and milk to the people of the country.

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Credit for this achievement must go to the intensive studies made in accessory nutrients like the vitamins and minerals. To this has lately been added the antibiotics which have become more nutrient materials than their original role of bacteriostatic agents.

Major health problems mitigating against longevity in which nutrition is implicated are many. Obesity is one in which the characteristic feature is the failure of the appetite to maintain the calorific balance. Diabetes is another metabolic disease in which faulty utilization of the carbohydrate causes the affliction of millions of people in the country.

Though controlled by insulin its prevention and cure are still unknown. Gout involving the deposition of a metobolite, viz sodium urate, is still another nutritional disease, whose cause, prevention and cure are still obscure. When these nutritional diseases are well understood and prevented it would go a long way to increase health and life span of mankind. Our leading killers are however cancer, diabetes and nephritis. In cancer, there is a tendency for the tumour metabolism to be glycolitic as in the case of tissues with inadequate supply of oxygen. Uncontrolled synthesis of protein is another metobolic problem in cancer and nutrition offers a fertile field to study the control of these major killers which reduce the life span without realising our full age potential.

While increasing one's life span in full health is the major problem all over the world, in India we have the added problem of inadequecy of even the major food stuffs to keep body and soul together. Consequently, it has become the pre-occupation of scientists in India to find substitutes and make more and more adjustments in the dietary needs of the people of the country. The "toned" milk to be supplied from the month of July for the Madras City is the most recent of such adjustments necessitated by the lack of the genuine cows milk. "Toned" milk is prepared by diluting buffaloes milk with equal quantity of water with the proper proportion of skimmed milk powder so as to attain the standard and quality of fresh cows milk in total-solids, solids-not-fat and fat.

Prior to this we had the new formula for balanced diet propounded for the poor by Prof. Giri and Dr. Rajagopalan of the Indian Institute of Science, Bangalore, described as a multipurpose food containing all ingredients essential for nutrition and said to be made up of a mixture of groundnut cake, gingelly cake, and soya bean powder. This again is an adjustment necessitated by the lack of the real genuine material like meat, pulses, eggs, and milk which are in short supply and costly to reach down to the rank and file of the people. Still earlier to this is the example of the synthetic

rice, rich in proteins, which was produced and standardised four years back at the Central Food Technological Research Institute, Mysore. This is made by processing groundnut cake with tapioca flour. Inspite of all these substitutes devised by our scientists very few have taken to these alternate sources of food. Dr. McCarrison while at the helm of affairs at the Coonoor Nutritional Institute had shown some thirty years ago that the rice eater of South India has need to supplement his rice with enough milk, pulses, green leaf vegetables and fruit to live in good health. During these thirty years our economic condition has not risen to the stage when we can afford all the aforesaid food materials to supplement adequately our requirements.

Even our net calorific requirement per capita remains nearly 600 to 1,000 calories lower than the average requirement. This is, therefore, the cause which motivates our scientists to present ways and means of adjusting our dietary set up to tide over the inadequecies of our present food. But this at the most is only a make-shift arrangement and our main objective should be to attain the real articles of food as recommended by McCarrison instead of living on substitutes. The sooner we tide over this reign of substitute food materials the better it will be for the Nation and for the expectancy of our people. And the solution is in the hands of our Farmers and Dairymen who should strive to get more and more out of the land and the cow to supply enough protein and milk to the people of the country.

A Production Plan for Raw Cotton in the Madras (Undivided) State

by

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(Continued from May issue Vol. XLII, p. 165)

Crop Mixtures — Long Term: The advantages of mixed cropping have been widely recognised by the dry land farmers of the Madras State and consequently it is common feature in almost all districts. John et al (1943) and Balasubrahmanyan (1950) have summarised the experimental data recorded at the Agricultural Research Stations while the latter had further opportunities for observing the potentialities under the Cotton Extension Scheme during the years 1950 to 1953 both on the Government farms and on the cultivators holdings.

The majority of dry land farmers in Madras State grow pure crops of groundnut continuously on the same land without any rotation while poorer cultivators owning small areas prefer to raise other crops mixed with it. The various crops with which groundnut is commonly sown mixed under rainfed conditions are gingelly and redgram in Visakhapatnam and Godavari; *Jowar*, Kodo millet, cotton, redgram and castor in Guntur, Krishna and Ceded Districts; redgram and castor in the Central Districts and redgram, *Jowar*, *bajra* and gingelly in South Arcot, Chingleput and Tanjore depending on types of soil and the rain pattern. The normal area under groundnuts in these districts is forty lakh acres per annum, a part of which alone is now being sown mixed with redgram, gingelly, castor, cotton or millets. A cotton crop will admirably suit such mixed cropping since the feeding zones of the shallow rooted groundnut and the deep rooted cotton lie at different soil depths and no competitive or depressing effects have been noticed in all the trials conducted so far. Mixed cropping with cotton is not only the most remunerative practice but is also an effective insurance against vagaries of the season and risks from damage by pests and diseases which the groundnut crop is usually subject to.

The crop of chillies grown as a rainfed crop over a lakh of acres in the districts of Guntur, Krishna, East Godavari and West Godavari is generally subject to severe damage bordering on total failure by an insect called thrips. The farmers who are obliged to

manure heavily, to cultivate the land properly and to raise healthy nurseries at considerable cost, suffer monetary losses which cannot be avoided even with the planting of thrip tolerant varieties like G 1 evolved at Guntur. Consequently, the area under the chilli crop has been steadily going down. Some of the farmers in East Godavari district are growing even today, chillies mixed with red cocanadas cotton. The chilli plant does not suffer by shading or competition effects of cotton which on the other hand bears a heavy crop on account of both the wide spacing of 7′ x 5′ adopted and liberal quantities of manure applied to the chillies. Experiments on such mixed cropping were conducted for over three years at the State farm in Guntur. The extra gross monetary return from the mixed crop ranged from Rs. 10/- to Rs. 90/- per acre depending on the extent of thrip damage, and in no year the return from mixed crop was lower than the pure crop. The device should therefore serve as an effective insurance in thrip-infested years and a harmless practice in thrip-free seasons. The cultivator runs no risk in any year and will produce on an average 40 lb. lint from every acre of such mixed crop.

Some farmers of Ramanathapuram and Tirunelveli Districts were cultivating Cambodia cotton as a mixture with irrigated finger millet. Of late, the area under such mixed cropping, has considerably dwindled mainly due to the attractive prices ruling for the food crop. The planting of finger millet and cotton (invariably Cambodia) is simultaneous and done in the months of August and September. Finger millet seedlings are transplanted in beds while the seeds of the Cambodia cotton are dibbled in both beds and on the sides of ridges. Sometimes it is also usual to broadcast the cotton seeds, form beds and transplant finger millet seedlings. There is no apparent difference between the two methods except in the ultimate seed rates. Hand dibbling requires about 6 lb. of cotton seed while broadcasting needs double this quantity. The cereal which outgrows cotton rapidly is harvested by the first week of January when a good hoeing and earthing up is given to cotton. The crop responds remarkably to the cultivation and yields a good harvest by the end of March. The farmers have not only not experienced any fall in the yield of finger millet in such associated cropping, but have actually obtained good yields of cotton depending on the fertility of the land and irrigations given till the middle of April. The farmers would be well advised to revive this sound practice which would reduce the gap in internal production of raw cotton in the country.

In the districts of South Arcot, North Arcot and Chittoor, the usual practice is to plant finger millet in the month of January and dibble later at the time of first hoeing the spreading variety of groundnut or sow bunch variety of groundnut at the time of the harvest of the cereal crop. Sometimes Cambodia cotton is grown after the harvest of cereal in March. Experiments were conducted at the Agricultural Research Station, Palur and observations were made on the cultivators' lands in all the three districts by planting cotton of the Uganda type along the ridges separating two contiguous beds and the irrigation channels. The seeds were planted after pre-treatment with cowdung and red-earth at distances of six to eight inches on the inner sides of ridges on the same day as the cereal was transplanted. A life irrigation was given after three days. Subsequent interplanting of groundnuts and treatment of the crop were in no way different in such mixed cropping as compared to the normal practice. The cotton crop was observed to grow well and did not in any way interfere with the ragi or groundnut. Their yields were not affected and cotton gave 100 to 475 lb. of kapas per acre depending on the dates of planting, soil fertility and frequency or irrigations. The harvests of cotton crop were completed by the time the groundnut was ready for lifting. No special treatment to cotton will be required in such mixed cropping except for irrigations, intercultivations and manuring given to the cereal. Although Uganda cotton was found to be a good type for mixing with finger millet and groundnut raised under irrigation during summer, Punjab 216 F which had a short duration was found more suitable in the areas where water was the limiting factor or where the bunch groundnuts had to be harvested earlier than in spreading variety. The quality of Punjab 216 F being very much similar to that of Uganda Cotton, should be preferred in such areas. Observations made on cultivators' holdings in Chittoor, South Arcot and North Arcot districts have also shown that cotton varieties like P 216 F could be grown mixed with irrigated summer groundnuts. The cotton crop came to harvest along with groundnut and no ill effects like shading of cotton plants on groundnut crop were noticed. The cotton plants were vigorous and prolific in yield. No extra expenditure was involved on manuring and irrigation by interplanting cotton in the groundnut crop. Yield as high as 400 to 500 pounds of kapas were obtained in addition to the normal yield of irrigated groundnut, thus bringing definite extra income to the cultivators. In the fourteen trials conducted on cultivators' holdings during the year 1951 MU 1 mixed with groundnut and finger millet, yielded on

an average 804 lb. and 677 lb. seed cotton per acre respectively while P 216 F. mixed with finger millet recorded 842 lb. per acre. The farmers of the districts of Chingleput, Chittoor, North Arcot and South Arcot can help in the production of more cotton, relieve the pressure on foreign exchange and benefit themselves by earning an increased profit of Rs. 50/- to Rs. 200/- per acre.

In Nellore, the finger millet crop planted in the months of November and December usually come to harvest in April and May. If cotton varieties like P 216 F having more or less the same duration could be grown mixed with it all along the ridges separating beds and also along the irrigation channels in such fields, it should be quite possible to extend this method over a greater part of 97,000 acres reported to be under finger millets annually in Nellore. A seed-rate of 6 to 8 lb. of cotton will be sufficient to plant one acre. The finger millet can be transplanted first and immediately it is over, cotton can be dibbled on the ridges separating beds at the rate of three seeds per hole spacing them about six to nine inches. A life irrigation may be given on the fourth day after such planting in order to soften the crust that may form and to help the germinating seedlings in pushing out the hardened soil at the top. Thereafter no special treatment to cotton is required except for the irrigations. inter-cultivations and manuring which might be the same as given to the cereal crop.

The cultivators in parts of Guntur and Krishna now grow one line of red cocanada cotton mixed with five to twenty one lines of groundnut in the months of June to August. The bunch variety comes to harvest in October while the spreading type is lifted in November or a little later. The cotton remains on the land till the end of March. The long duration of cotton necessitates keeping watch over the fields for preventing damage by cattle. A similar practice to a limited extent is also prevalent in other districts like Bellary, Anantapur, Kurnool, Cuddapah, South Arcot and Chengleput where the local varieties of cotton viz. Westerns 1, Mungari, Northerns and Cambodia are grown in association with groundnuts and cereals on lands of medium and high fertility under raingrown conditions.

The defects in duration and quality of local cottons were sought to be eliminated by replacement with short duration type capable of completing the harvests by the end of November i. e. a fortnight later than bunch variety of groundnuts. Experiments

conducted at Guntur showed that the early cotton variety H. 420 mixed with groundnuts in the proportion of 1 to 14 could yield gross gains ranging from Rs. 15/- to Rs. 75/- per acre depending on the soils and seasonal conditions. The cotton crop completed the harvest by the end of November and yielded on an average 40 lb. lint per acre. Trials conducted at Hadagalli in Bellary district showed that when the cotton-groundnut mixture was sown during the second week of July, the groundnut crop came to harvest by the end of October, while cotton has to be retained up to December. The yields obtained per acre were 25 maunds of cotton and 10 bags of groundnut. The ruling prices on the date were Rs. 20/- per bag in the case of groundnut and Rs. 10/- per maund for cotton. The net profit realised by the mixture was Rs. 299/-. Favourable reports of similar nature were also received from Mantralaya in Bellary district where a farmer grew such a mixture voluntarily under advice. The groundnut sowings were done in the first week of July in rows of 27 inches apart and Westerns 1 cotton was sown between the groundnut rows in September. Groundnut was harvested in October and Cotton was allowed to stand on the field till March. The yield of cotton crop was remunerative and in later observations better yields were realised when cotton was sown in August itself.

All farmers of the State planting *kharif* crops on drylands will generally benefit if they sow short duration cotton H. 420 mixed with groundnut. In the districts of Salem, Coimbatore, Tiruchirapalli and Madurai where the Pest Act is under operation, H. 420 can be grown with advantage since there is no prohibition against the retention of a non-American variety beyond September. One row of cotton can be sown for every 5 to 21 rows of groundnut depending upon the conditions of the tract. In Bellary, Cuddapah, Kurnool and Anantapur districts, Luxmi variety of cotton can be dibbled in the standing crop of groundnut in the month of August on the lighter soils while the Westerns cotton must be sown on deeper soils in the month of September.

The popularity of 420 cotton which was imported in large quantities from Madhyapradesh State and distributed under the Cotton Extension Scheme in the Ceded districts of Bellary, Anantapur, Kurnool and Cuddapah for being grown as a mixed crop with groundnuts and cereals in July has been well-established and it is finding favour in the circars especially Guntur and Kistna districts for the same purpose. Its extension in other groundnut

regions of Coimbatore, Salem and Tiruchirapalli can be achieved only slowly under steady and intensive propaganda. The cultivators appear to prefer the Punjab American variety P 216F or the Madras American Cotton MU1 in the districts of Chingleput, North Arcot and South Arcot for mixing with groundnuts and finger millets. The Westerns and Northerns cotton are still in great demand when sown mixed with cereals during August. The efforts of the departmental staff in extending the cultivation of chillies mixed Coconada cotton in the Circars were unsuccessful. The main reasons were the soaring prices of chillies and the comparatively low prices offered for red cotton, the availability of insecticides at concessional rates for controlling thrip damage, the need for preventing cattle trespass and keeping watch over standing crop of cotton in such mixed crop areas long after the harvest of associated chillies. The practice is unlikely to extend unless short duration medium staple cotton varieties having the same crop life as chillies are evolved and there is parity in these prices of the two crops. The problem of cattle trespass can be solved only when farmers join together and grow the mixture in contiguous compact areas in each village.

Cultivation of Sea Island cotton in West Coast Long term: The rainfall and humidity of South Kanara and Malabar offered immense possibilities for the development of high quality cottons like Sea Island on the model of West Indies. Small scale trials were conducted in the year 1947 and later elaborated under a special scheme financed by the Indian Central Cotton Committee, Bombay. The experiments have reached a stage where the problem is not whether Sea Island can be grown but what agronomical treatments are to be done for making its cultivation remunerative to the growers. Early planting and application of fertilisers appear to be indispensable for success. The average yield per acre has to be pushed up to the level of 100 lb. lint. The process will prove less difficult if varieties having a shorter staple of about $1\frac{1}{4}''$ and higher ginning out-turn are evolved. It is possible to extend its cultivation as intercrop in coconut plantations covering four lakh acres, in *modan* lands over 65,000 acres during fallows and in another 65,000 acres of *Kumeri* lands where a system of shifting cultivation is practised. The cotton grown in the experimental area has been well commented upon by the Indian mills who manufacture sewing thread and who are obliged to import costly Egyptian cotton for such a purpose.

Improvement of farming practices Long term: The farmers in the blacksoil tract of Coimbatore District harvest their rain-grown *Periamanjal Jowar* in the month of February leaving 6 to 9 inches of the stubbles in the soil. These stubbles remain in the field till the cultural operations for the succeeding cotton are started in July and invariably ratoon after the summer showers. The limited moisture is thereby depleted during the hot months. The Karunganni cotton sown on such lands often records low yields especially in years when the South-West Monsoon is weak the North-East rains are late. The reduction of the rainfed cotton amounts to 10 to 15 percent over an area of 50,000 acres in the district.

If the stubbles of cholam are immediately removed by working blade harrow instead of allowing the stubbles to stand on the field until sufficient rains are received for ploughing the field, the depletion of soil moisture can be prevented. The yield of the succeeding cotton crop which is increased by about 8 lb. of lint per acre more than compensates for the charges incurred on post harvest operations. It is a very minor variation of the local farming practice whose wholesale adoption in the district of Coimbatore and Trichinopoly will augment the output of Karunganni cotton to the extent of 1000 bales of lint per annum.

In this State, Cambodia is grown in two seasons viz., cold weather and summer months. The major area is cropped in cold weather corresponding to the period September–April between planting and end harvests. The early planting in September is largely in vogue in the taluk of Coimbatore where the farming system is aligned on an intensive *jowar*–cotton rotation, with September–March for Cambodia and March–July for *jowar*. In the late–sown tracts of Coimbatore, Salem, Tiruchirapalli and Mathurai Districts which constitute the bulk of the acreage, the prevalent rotation is finger millet–cotton or *bajra*–cotton partitioned on the basis of June–September for cereal and October–April for cotton. Water stress and seasonal limitations have circumscribed the components of the existing rotations, and the advantage of September planting could not be extended in *toto* in the late–sown areas. The experiments conducted on the agronomy of the crop at Coimbatore with the popular strain MU 1 in recent years by Kannian and Balasubrahmanyan (1952) have demonstrated that close spacing of 3" in line with 30" between rows (equivalent to 79,000 plants per acre) recorded the highest yields per acre

irrespective of sowing dates. Hence close planting of a late crop will never compensate for the delay in planting under Coimbatore conditions. The difference in yields between the normally planted and close planted crops was roughly 200 lb. seed cotton per acre. It was also found that planting in line on ridges and irrigating in furrows economised water and gave as much yield as the local system in which the sowing was broadcast and irrigation was through flooding in beds. The subsequent operations like weeding and hoeing could be done efficiently with labour saving implements like Junior hoe worked with bullock power as against costly mammoty and hand hoe requiring a large contingent of men and women. The practice merits large scale extension in the whole of Cambodia tract in Madras State.

Weather hazards Long term: In the raingrown tracts, the limiting factors affecting production are soil, drought, untimely rains and atmospheric temperature. The soil drought in arid regions is very much interrelated with erosion; control and soil conservation methods which cannot be accomplished without state aid. Bunding, tie ridging, wide spacing and drought evading varieties are the commonest recommendations made with regard to Ceded districts which grow seven lakh acres of cotton in normal years. Contour bunding as a soil conservation method has beca done on a limited scale in the Bellary district. It will not be possible to cover very large areas in short time even with state aid. Private effort is equally indispensable, if substantial annual progress is to be ensured.

Combodia Cotton in South Arcot District is at present planted in the month of March and irrigated from wells in the same manner as the *masipattam* Uganda cotton grown in the taluk of Srivilliputtur and its contiguous areas. The crop though extremely satisfactory from the point of growth and healthy appearance is very disappointing in seed cotton yields which seldom exceed half to two-thirds of the Srivilliputtur average. In addition, other defects like imperfect boll opening and poor seed germination are also noticed. Liberal applications of manures or irrigation water fail to correct them. The problem was taken up for a closer and intensive study at the Agricultural Research Station, Palur in South Arcot District from the year 1944. Flower drop was observed to follow periods of high atmospheric temperature and examination of such shed flower revealed the presence of a large proportion of defective pollen. It was concluded that if the hot periods during flowering and fruiting periods could be avoided, the various defects

could be rectified. Experiments aimed at forcing early maturity through (a) shifts in planting dates (b) close planting and (c) development of short-duration varieties, were conducted for over three years from the year 1946. The conclusions were that December planted crop of Uganda-1 always gave three times the yield of March—sown cotton, aad that close planting combined with frequent irrigations during hot months increased the yields further. The quality of seeds, however, remained generally poor though some improvement in germination was registered. The cotton farmers of South Arcot, who are likely to experience the ill-effects of hot summer on the *masipattam* crop will therefore be advised (a) to plant cotton early in the months of December—January (b) to choose early duration varieties recommended by the Agricultural Department (c) to plant cotton close and irrigate frequently during hot periods (d) to use only seeds from other districts for sowing purposes and (e) to manure the early-planted cotton in preference to late-planted areas. The wholesale adoption of the above recommendations will help every farmer to treble his profits per acre and place the production of long staple cotton in Madras and India on a sound basis.

The main reason for the slow adoption of the above experimental finding by the farmers of the district is on account of their present practice of growing short duration finger millets in January and following it up with summer cotton in March. The defect can be partly got over if cotton can be grown as mixture with finger millets even in January and treated as a pure crop from March after harvest of cereal or if cotton is grown unmixed with finger millets in December-January since the nett profits will be more than either the mixed cropping or the one following the other. In the context of the present ruling prices for certified M U 1 cotton and falling prices of finger millet, pure cropping is bound to prove comparatively more remunerative.

The Karungauni crop of Tinnies area is subject to shedding of floral parts during periods of untimely rains in the month of February and to low yields in years of subnormal rains. On account of these hazards, the mean yield of the area has been fluctuating. Both these defects have been avoided through evolution of early maturing and drought resistant strain K. 2. whose spread will stabilise the annual production. The new variety K. 2. has recorded average yields of 350 lb. of kapas per acre even in a year of drought while the yields of the local variety ranged from total failure to

200 lb. per acre. Its outturn of lint in ginning and its mean staple length of 15/16 are other good points which have already attracted the attention of many mill-owners.

Homestead Cultivation–Long Term: The development of perennial cotton varieties for backyards, homesteads and unreclaimed waste blocks of average fertility, subject to outbreaks of malaria or labour scarcity offers another fruitful line of attack. The work done by Balasubrahmanyan (1950-52) has revealed that under the present day conditions which make possible the effective control of insect damage through pesticidal dusts and sprays, the evolution of suitable varieties in American 'Deshi' and first generation hybrids is desirable. In the State wide trial conducted over three years Moco with its long fine staple and resistance to pests among the South American perennials, Nadam in the short staple group among indigenous types and first generation hybrids between Moco and Cambodia held out fair promise for extension depending on the conditions of soil and rainfall in the respective districts. The production will meet atleast the entire needs of Khadi and extra factory consumption which may be placed at 20,000 bales per year if a concerted effort is made for their propagation.

Breeding Better Varieties–Long Term: Madras has organised her research in such a way as to tackle regional problems relating to every trade variety in one of the permanent Agricultural Research Stations financed by the State or in special schemes subsidised by the Indian Central Cotton Committee, Bombay. The main aims of the breeding programmes are improvement in yield per unit area, higher ginning outturn, longer staple, better maturity of fibre, greater adaptability over a wider range of agricultural conditions and capacity for resistance to adverse factors like drought, pests and diseases.

The cultivated varieties of *arboreum* and *herbaceum* in Madras are low ginners ranging from 23% to 33% while most of the *arboreums* and *herbaseums* grown in other parts of India possess a higher ginning outturn. Varieties from *cernuum, bengalense* and *herbaceum* were used for hybridising with local types. All strains under release or in advanced stage of the trials in the various *deshi* cotton areas are mainly those derived from the progenies of the above hybrids. The low ginning trade varieties viz., Northerns, Westerns, Coconadas, Chinna pathi, Umri, Uppam and Tinnies are either in the process of gradual elimination or has been already displaced by higher ginning

hybrid strains and new extra-state introductions. The use of *herbaceum* strains from Broach & Viramgam for crossing with Westerns cotton has given high ginning biotypes. The introduction of H. 420 from Madhyapradesh has helped the slow elimination of short staple mungari and chinnapathi as well as low ginning umri. Eventually it may become popular in the Cocanada region too. The synthesis of long staple *deshi* cotton exceeding one inch by Ball's Sorter test is yet another achievement in the *arboreum* group of cottons. They are expected to spin 40's warp and give an even nep free yarn on account of their high maturity.

The improvements registered in American group of cottons are equally noteworthy. Persistent and continued reselections in intrahirsutum and interspecific hybrids involving exotic varieties from East Africa, Egypt and West Indies have yielded stable, productive, long staple, high ginning and adaptive types. In some of them, duration has been reduced, a ginning of 38% realised, staple lengths exceeding 13/16" reached and resistance to blackarm and jassids registered. A new long staple substrain from MU 1 capable of spinning 40's warp counts and adaptable for being grown on rainfed and irrigated winter as summer seasons was developed. The still later strain MU 2 can spin 50's warp although it has only adaptability. In the rain grown regions, Luxmi cotton from Dharwar has acquitted so well on the black soils of average fertility in Bellary district that the area shot up to nearly one lakh acres during last year as per estimates.

The discovery of P 216 F as a suitable cotton for short summer fallows of Tanjore and other areas enjoying irrigation facilities is the outcome of research undertaken with a special purpose. In the new variety P 23 F, the duration has been still further shortened by about a week. Since the year 1945–46, the wild cotton varieties were employed in hybridisation for evolving hardier and better races. The derivatives of hybrids with tetraploid *(taitense* x *darwinii)* and hexaploid *(hirsutum* x *raimondii)* were the most promising. The former group crossed with Combodia 4463 gave jassid and drought resistant strains while the latter group with Cambodia 7682 (an interspecific multiple hybrid *(barbadense* x *hirsutum)* yielded productive, high ginning and blackarm resistant biotypes.

A general idea of the staple length and ginning out turn improvements realised in the last quinquennium compared to the standards of the varieties under cultivation is given in Statement II.

STATEMENT No. II.

Name of the variety	Parentage	Mean staple length 32nd inch.	Spinning value H. S. W. C.	Ginning out turn	Special attributes and defective traits
American Cotton :					
(a) *Under cultivation :*					
CO 2	Pure line selection from imported Cambodia	28 to 32	24/35	35	Late maturing, susceptible to stem weevil
CO 3	Derivative of a cross between CO 2 and South African uplands	30 to 32	38	37	Early maturing, susceptible to stem weevil and *blackarm*
MU 1	A reselection from a derivative of a cross between CO 2 and South African uplands	30 to 34	40/45	35	Very early, tolerant to *blackarm*
MU 2	An inter-specific multiple hybrid derivative	31 to 34	52	35	Very early, high spinning
P. 216 F.	A selection from Punjab American	29	34	30	Very early suited for rice fallows, susceptible to red-leaf
Laxmi	G. 1 × CO 2 hybrid derivative	29	40	30	Early variety suited for unirrigated blacksoils of Ceded Districts
(b) *Awaiting release :*					
9030	Multiple hybrid derivative	31	42	36	Adaptable for Winter Cambodia tract
0734	do.	30	42	34	
9995	do.	30	39	34	
0744	do.	31	40	36/34	
(c) *Special tracts :*					
Sea Island	Montserrat in West Indies	48 to 36	100	28	Suited for rainfed cultivation in West Coast
Moco	G. *hirsutum* race *marie-galante* from South America	30 to 32	40	30	A good quality perennial variety for homesteads
Nadam	G. *arboreum* race *indicum*	18	12	23	An inferior quality perennial cotton resistant to droughty conditions
(darwinii × taitense) × *hirsutum*	Derivatives of hybrids with wild tetrapolids	30 to 34	40	35	Culture 9—S—2 is *jassid* tolerant

STATEMENT No. II—*(Contd.)*

Name of the variety	Parentage	Mean staple length 32nd inch.	Spinning value H. S. W. C.	Ginning Out turn	Special attribut es and defective trains
raimondii × *hirsutum* derivatives	Tetraploid derivatives of hybrids with hexaploids	30 to 34	40	32	Cultures 1—21 and 1—22 are *blackarm* resistant
Deshi Cotton:					
(a) *Under cultivation:*					
K2	Derivative or cross between *indicum* and *cernuum*	28 to 30	30	34	Escapes untimely February rains in Tinnevellies area
K5	do.	28 to 32	30	34	Adaptable for Coimbatore tract
N. 14	Pure line from Northerns (G. *arboreum* race *indicum*)	28 to 30	40	25	Low ginning, high spinner, suited to high rainfall regions
C. 1	Derivative of interstrain cross within G. *aroboreum* race *indicum*	28	30	28	Red cotton, light brown in colour
C. 2	Derivative of interstrain cross within G. *arboreum* race *indicum*	28	30	28	Red cotton, medium brown in colour
Rayalaseema—1 (881—F)	Derivative of cross between *indicum* and *cernuum*	28	30	34	Late than Mungari local
H. 420	do.	27	26	33	Early variety, suitable for mixed cropping
Mungari	G. *arboreum* race *bengalense*	16 to 18	10	36	A coarse short staple type
Chinnapathi	G. *arboreum* race *inducum*	16 to 18	10	26	Early maturing, short staple type
Westerns—1	Pure line from Westerns (G. *herbaceum* tsvr *acerifiium*)	26 to 30	24	30	Early maturing, ~~asty cotton
(b) *Awaiting release:*					
6186—9	Derivative of cross between *indicum* and *cernuum*	30 to 32	34	33	Adaptable Karunganni selections with good yield and spinning
6188—8	do.	do.	39	33	
6312—4	do.	do.	41	33	
6874	do.	do.	40	33	
2711	Derivative of (W. 1 × Improved Jayawant) × 1027—ALF	26 to 30	30	35	High ginner and low fibre weight
6234	Derivative of a cross between *indicum* and *cernuum*	30 to 32	40	33	Later in maturity than N. × 14 better in ginning and yield

The particulars also include new introductions and varieties developed for special purposes. It may be seen from the statement that all short staple varieties below $\frac{7}{8}''$ will be ultimately ousted and the whole of the Madras State will come under medium and long staple area.

Pests and Diseases Long and Short Term: Pink and spotted boll worms, stem weevil, jassids, red bug and leaf rollers among insect pests, and blackarm in diseases are the major affections in the province. The system of intensive cultivation of irrigated cotton involving a long non-cotton period of over five months has not very much altered either the initial incidence, crop loss or quality damage. The exclusion of desi cotton from the operation of cotton Pest Act and non insistance of any close period for unirrigated American cotton are responsible for the present pest situation. The damage caused by stem Weevil has been minimised by using the resistant Moco type as a parent. Further selection in the material is being pusued. The problem of Jassids has been fully investigated in the enquiries intituted both at Siruguppa and Coimbatore. The conclusions are summarised by Balasubramanyan and Kesava Ayyangar (1950) and Kannyan and Balasubramanyan (1952). Early and close planting of hairy resistant types offer the best solution. Gueserol 550 sprayed for controlling Jassid damage was found to reduce yields. Red strainers in South Arcot and boll worms all over lead to premature boll opening, stained cotton and poor quality lint. Insecticidal control is the only means of keeping them under some check in our present state of knowledge on their bionomics and life history. Breeding for resistance to boll worms using the wild cotton *thurberi* is already figuring in the programmes but it will prove to be a very slow and long drawn task requiring good deal of knowledge and patience for the proper synthesis. The extended use of methyl bromide for fumigation of all sowing seed soon after ginning of Kapas will not only keep down the cost of treatment and crop losses but will also improve the quality of harvests. The control of blackaram which is a disease of recent origin and which has assumed a major importance of late is being accomplished through selection for resistance by adopting the spray technique evolved by Dr. Knight in Sudan. The varieties given out for large scale propagation are being thoroughly tested first in pots by the Government Mycologist and later in field by secondary inoculation methods before release. The seed dressings with organo-mercurial compounds have proved their undoubted worth in controlling blackaram in Anglo-Egyptian Sudan. The adoption

of such pretreatments in so far as the American cotton seeds are concerned will stablise the production, and quality of long staple cotton varieties of MU 1 and MU 2 class which are today the pride of India. There is an urgent need to organise and to develop effective control measures through pesticides, fungicides and fumigants in the state.

Seed Supply Short Term: Finance for seed multiplication work is now derived partly from subsidies granted by Indian Central Cotton Committee and partly from the State funds. The overhead charges on supervision and miscellaneous contingencies amounting to Rs. 5/- per bag of 100 lb. seed, has to be collected from the cotton farmer as premium for good seed if the schemes are to work on a self supporting basis. Majority of the farmers in the State are reluctant to pay the premium and as such the percentage of the growers who purchase the pure seed from the depots is low. The bulk of the sowing seed is supplied by private traders whose stocks are far inferior to the certified seeds. The defect can be remedied only when the growers themselves organise and develop the primary stocks of departmental seed by decentralising it on a village basis, leaving only the burden of supplying nucleus seed every year to the Agricultural Department. The other alternative will be to raise a separate pure seed fund by levying a small cess from the primary transactions of kapas and lint, sufficient to cover expenditure on seed production required for the whole area. It will not be possible unless the trade and the mill co-operate, and legislation is passed.

Marketing: The Madras Commercial Crops Markets Act has been recently amended so as to make it more efficient and to combine more than one commodity in markets where trade in crops other than cotton is in vogue. It will be possible eventually to open regulated markets in all important centres of the State. Such an expansion will instill confidence in the growers, avoid deliberate type mixtures and ensure maintenance of grade and purity. In the new areas, price guarantees and introduction of flat rates at all points with full and free facilities for transport will stimulate interest in cotton growing.

Legislation: The amendments incorporated in the Cotton Ginning and Pressing Factories Act (Madras) will effectively check the various malpractices of watering and mixing in the processing stages. The Madras Cotton Control Act aimed at the control off of variety of cotton grown in a zone and at prevention of

mixing in any stage, will further tighten up the measures taken towards maintenance of quality from the field stage. An Agricultural Seeds Act or a state check in all stages like Egypt will be very necessary for ensuing purity and grade, and for building up reputation in trade, internal as well as external. The provisions of the Cotton Transport Act have to be strictly applied especially in border zones by tightening vigilance on road and rail transport of seed and kapas. Otherwise the purity of the crop in the areas will be slowly undermined. A cotton certification scheme for MU 1 cotton has been working in Madras State from the year 1951. Under its provisions, all certified cotton is eligible for prices above the ceiling fixed for Cambodia and during the period of decontrol of prices, it will equally command a premium based on the ruling rates for East African styles. It is stated that the consuming mills are able to obtain good quality MU1 cotton since the introduction of the scheme.

Conclusion: In the forgoing paragraphs an outline of the various measures by which the raw cotton production could be increased without clashing with food programmes of the state was given. Unlike other states in India, Madras has varied crops, seasons and soils which would lend themselves admirably for large scale extension under mixed cropping, fallow cultivation and intensive farming. The cotton crop which can be grown through out the year in most of the places has only to be fitted in any one of the three broad categories named above, through a proper choice of variety and planting time. Substantial increases in production on the existing area of cultivation can be achieved through a wider application of agronomic recommendations made in the paper. All of them have been tested not only on the Agricultural Research Stations but also on the cultivators' lands as part of the Cotton Extension Plans. The targets for production given in Statement III are based on average responses obtained during the last two years. Even on a very modest estimate of roping in only a portion of the ultimate potential area the extra annual production of American (long staple) and Deshi (short staple) cottons will amount to 5,32,000 bales and 1,18,000 bales respectively. India is importing large quantities of cotton in the staple length group $1\frac{1}{8}''$ to $1\frac{1}{2}''$ for spinning yarn of fine counts. The price structure of the imported medium long and extra long staple cottons is largely dependant on the future developments and requirements of fine spinning industries in the world and on the extent of competition from the synthetic

STATEMENT No. III.

Item No.	Particulars of extension work	Potential normal annual area over which the extension can be done	Estimated annual area over which the extension is proposed to be done	Anticipated average increase in lint yield per acre	Extra annual production in terms of bales of lint (400 lbs.)	
					American Cotton	Deshi Cotton
		Acres	Acres	lb.		
1.	Utilisation of rice fallows in Cauvery, Kistna and Godavari deltas, tanked fed areas and other river projects where canal or underground water is available during summer ..	10,00,000	5,00,000	200	2,50,000	..
2.	Intensive cultivation and extension of cotton growing in new river projects viz. Tungabadhra Lower Bhavani and others under examination ..	5,00,000	2,00,000	200	1,00,000	..
3.	Application of fertilisers to existing area of irrigated Combodia Cotton ..	2,00,000	1,60,000	80	32,000	..
4.	Application of fertilisers to existing area of :—					
	(a) unirrigated Cambodia ..	2,50,000	2,00,000	25	12,500	..
	(b) unirrigated Karunganni ..	4,50,000	3,00,000	20	..	15,000
5.	Mixed cropping of irrigated Cambodia with *guara* ..	30,000	20,000	20	1,000	..
6.	Mixed cropping of irrigated Cambodia with finger millet ..	2,50,000	1,00,000	100	25,000	..
7.	Close planting of irrigated MU 1 Cotton in early sown areas of Coimbatore District ..	30,000	20,000	20	1,000	..
8.	Early planting of irrigated MU 1 Cotton in South Arcot Dt.	3,000	2,000	100	500	..
9.	Development of perennials in homesteads, backyards and waste blocks :—					
	(a) South American types ..	..	..	..	15,000	..
	(b) Deshi-nadam ..	..	..	..	..	5,000

STATEMENT No. III—(*Contd.*)

Item No.	Particulars of extension work	Potential normal annual area over which the extension can be done	Estimated annual area over which the extension is proposed to be done	Anticipated average increase in lint yield per acre	Extra annual production in terms of bales of lint 400 lbs.	
					American Cotton	Deshi Cotton
		Acres	Acres	lb.		
10.	Utilisation of interspacee in coconut gardens, *modan* fallows & *Kumari* lands of South Kanara and Malabar districts for growing Sea Island Cotton ..	5,30,000	2,00,000	100	50,000	..
11.	Mixed cropping with rainfed groundnuts :—					
	(a) American P. 216 F. and MU 1 ..	15,00,000	2,50,000	40	25,000	..
	(b) Deshi H. 420 & W. 1 ..	25,00,000	5,00,000	40	..	50,000
12.	Mixed cropping with rainfed chillies ..	2,00,000	1,00,000	40	..	10,000
13.	Mixed cropping of indigo with cereals in Tirunelveli, Ramanathapuram and Madurai Districts ..	3,50,000	2,00,000	8	..	4,000
14.	Early removal of jowar stubbles in rainfed black soils of Coimbatore and Tiruchirappalli Districts ..	80,000	40,000	10	..	4,000
15.	Reduction in crop loss due to pre-treatment with methyl bromide and organo-mercury compounds and control of other insects by pesticidal sprays or dusts on American Cotton ..	1,50,000	1,00,000	40	10,000	..
16.	Organisation of pure seed supply and application of Cotton Control Act over the whole area ..	16,00,000	16,000,00	5	5,000	15,000
17.	Improvements through breeding new varieties capable of higher yield, ginning percent, resistance to adverse factors, insects and diseases. This will include also introductions like P. 216 F., Luxmi and H. 420 from neighbouring States ..	16,00,000	16,00,000	5	5,000	15,000
				TOTAL ..	5,32,000	1,18,000

fibres which are slowly taking the place of extra long staple in the manufacture of fine apparel goods, airplane fabrics, typewriter ribbons and other products. The breeding policy adopted in the State and outlined in the plan is aimed at stepping up the production of these styles through gradual replacement of medium staple American varieties. Extension of area in West Coast will increase the supply of extra long staple, while cultivation on rice fallows, under new river projects and as mixed cropping with finger millet will augment the medium long staple supplies. The implementation of the various ideas mentioned in the paper will require preparation of detailed districtwise plans and getting them executed under the district work programmes of the Department as well as the regional projects, if any, like Community Projects and National Extension Plan working in that area.

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ERRATA

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Read Page 163. Line 15: Modus operandi for *Modes opurandi*.

,, Page 183 heading: Bracts for *Brackets*.

,, Para 2 line 1: Normal for *normol*.

,, Para 2 line 8: Rachillae for *reachillae*.

Experiments on the Control of "Damping off" in Tobacco Nurseries

by

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Introduction: Tobacco is an important money crop in South India especially in the Madras and Andra States. It is extensively cultivated in Nellore, Guntur, Krishna, West and East Godavari districts of Andhra State and occupies an area of more than one hundred thousand acres. Extensive areas of nurseries under the Virginian variety of tobacco are raised in the sandy belt from Bapatla to Kothapatnam (Coastal tract of the Guntur district) and in the black soil areas of Repalle, Guntur, Sattanapalle and Narasaraopet in the Guntur district to meet the requirements of seedlings for planting the above area. The chief limiting factor in the raising of nurseries was found to be the "damping off" disease of seedlings. This disease has been reported from most of the tobacco growing countries of the world. Several species of *Pythium* and *Rhizoctonia solani* have been shown to be associated with the "damping off" of seedlings. *P. aphanidermatum* (Eds.) Fitz. is the causal agent in India (Thomas 1943) and also in South Africa (Wager 1931, 1940), China (Yu 1934, Yu *et al* 1945), Gold Coast (Bunting and Dade 1924; Simond 1939). *P. aphanidermatum* has been found to be widely prevalent in all types of soils in the tobacco growing areas in the Madras State (undivided). Diseased seedlings collected from nurseries raised in sandy as well as black soil tracts in the important nursery areas showed the presence of *P. aphanidermatum.*

Various methods such as raised seed beds, sterilisation of seed beds, seed treatment and spraying have been successfully recommended by workers in other countries (Serbinow 1912). But as far as South India is concerned though these measures were advocated in some form or other definite experimental data were lacking. To find out therefore the most economic treatments for the effective control of 'damping off', experiments were laid out from the year 1943 onwards under a scheme of research sanctioned by the Government of Madras and the results of the experiments conducted during the years 1943 and 1944 are presented in this paper.

Materials and Methods: The experiments were laid out in two typical soil tracts viz., black soil area of the Agricultural Research Station, Guntur, representative of the area in which tobacco is grown

as a crop and in the sandy area at Bapatla representative of the sandy soils where by virtue of the better drainage conditions it is easier to raise nursery of tobacco seedlings with the result that a very successful nursery industry has developed, merely to supply seedlings to cultivators in the black soil area. The object of the experiment is to test the relative efficacy of various fungicides like a proprietary colloidal copper sold by Messrs. Boots Pure Drug Company, Calcutta, Bordeaux mixture and home made colloidal copper, as well as heat sterilisation of nursery beds and raising the level of the beds. Lay out: Split plot-randomized blocks; Replications-six.

Main treatments:	*Subsidiary treatments:*
A. Raised bed	Heat sterilized Non-sterilized
B. Non-raised bed	Heat sterilized Non-sterilized

Sub-plot treatments-3:

(a) Bouisol-1 ounce in one gallon of water.

(b) Bordeaux mixture-1%.

(c) Home made colloidal copper-3 pints of stock solution to 10 gallons of water.

(d) Control (no spraying).

The area of each sub-plot was 6' x 3' and the total number of sub-plots was 96 with treatments randomized within the sub-plots. Three sprayings were given at fortnightly intervals beginning from the 21st day after sowing. Heat sterlization of the seed beds was done as follows. Dried chilli stalks to a height of about 9 inches were packed over the beds in the black soil area and burnt when the air was still. Dry casuarina twigs and sweepings from casuarina plantations were used in the sandy area. After complete burning the ashes were lightly raked and incorporated into the surface soil of the beds.

The nursery beds were sown with the seeds of the tobacco variety Harrison's special (H. S. 9) at the rate of one tola of seed (2/5 of an ounce) for each cent of seed bed area. Watering was done with a rose can at a uniform rate for all the beds. No covering was used for the nursery in the black soil. In the sandy area a mulch of *Tephrosia purpurea* was used to cover the seed beds for about two weeks from the date of sowing. The results of the experiments were evaluated on the basis of total number of surviving seedlings in the different treatments.

The experiment was repeated during the year 1944 with some alterations. As Bouisol could not be procured on account of stoppage of imports due to war conditions, Burgundy mixture was substituted for Bouisol. Further as the home made colloidal copper was found

ineffective at the strength used (3 pints to 10 gallons) the strength was increased so that the copper content is the same for all the spray treatments.

The sub-plot treatments were therefore, given as detailed below:

(a) Bordeaux mixture (1%)
(b) Burgundy mixture (1%)
(c) Colloidal copper (1%)
(d) Control

During the previous year only one set of experiments in the black soil and one in the sandy area was laid out. As there was no incidence of damping off in the black soil experimental plots, no information was available about the effect of the treatments under black soil conditions. This year, therefore, the experiments were laid out in each of these places in duplicate at intervals of about a month with the hope of getting disease at least in one series if not in both. In all other respects, the material and methods were similar to those given for the experiment conducted during the previous year.

Observations: The germination was quite satisfactory and the stand of seedlings uniform both in the black and sandy soil areas. The initial growth in the sterilized beds however was found to be much better than in the non-sterilized beds. In the 1943 experiments the first sign of 'damping off' was found in a few plots in a mild form and to a very limited extent 33 days after sowing in the black soil area. The subsequent spread of the disease also was quite negligible. Thus though the total area of the 96 experimental sub plots was 1728 sq. feet, the final extent of damage was found to be only 9·61 sq. feet equivalent to about half the extent of a single sub plot.

In the sandy area unlike the black soil area, the incidence of 'damping off' in the experimental beds was found to be very severe causing considerable damage in a number of beds. It was observed that seedlings in 30 out of the 96 beds were completely wiped out and ten others had a stand of only 2 to 26 seedlings. The data recorded were statistically analysed. As the treatment effects could not be properly evaluated on account of the negligible incidence of disease, in the black soil nursery this experiment was not taken into consideration. But in the sandy area, 'damping off' was present in a virulent form. Hence the data collected are of value in assessing the relative merits of the various treatments tried. The summary of results and conclusions are given in the table.

In the 1944 experiments there was very heavy incidence of 'damping off' in the experimental beds in the first series in the black soil area. The total number of surviving seedlings in the various treatments and replications were recorded and statistically analysed. The summary and conclusions are given in the table. In the second series in the black soil

area also there was very heavy incidence of disease. The disease appeared very early just after three weeks from sowing and when the first spraying was due to be given. The disease spread to a considerable extent in most of the control beds and many of these were completely wiped out in a few days. Some seeds hitherto lying dormant germinated later and produced a few seedlings. The total number of surviving seedlings were recorded and were statistically analysed. The summary and conclusions are given in the table.

Two series of experiments were also laid out in the same year in the sandy area with an interval of five weeks between the sowings. Though the first series here was also laid out at about the same time as in black soil, the incidence of 'damping off' was quite negligible. Hence the experiment was not taken into account in assessing the merits of the various treatments. In the second series however the incidence of 'damping off' was found to be very severe causing considerable damage to a number of beds. The results in terms of surviving seedlings were recorded under the various treatments. The data were statistically analysed and the summary of results and conclusions are given in the table.

Discussion and Conclusion: Of the six nursery experiments conducted in the years 1943 and 1944 in the black and sandy soils of the Guntur District two experiments have been rejected since the incidance of disease was negligible. The data of the remaining four experiments were analysed and the following conclusions were evident.

1. There is no significant difference between the level of beds in all the four sets of experiments.

2. Sterilization of beds is significantly superior to no sterilization in three out of four series.

3. Of the fungicides tried Bordeaux mixture 1% proved superior to Burgundy mixture in one experiment and in the other two it was on a par. Between Bordeaux mixture and colloidal copper the former proved superior to the later in all the experiments. In the one experiment conducted with the proprietary fungicide 'Buisol', Bordeaux mixture proved superior to it. Burgundy mixture was on a par with colloidal copper in one experiment and proved superior to it in two experiments. Colloidal copper proved inferior to Bordeaux mixture in all the experiments, inferior to Burgundy mixture in two experiments and was on a par with Burgundy mixture in one experiment and with Buisol in another. Both Bordeaux and Burgundy mixture proved superior to control in all the experiments while colloidal copper was superior to control in three experiments and was on a par in one experiment, where the copper content in the colloidal copper was less than 1%. Of the three fungicides Bordeaux mixture is to be preferred in view of its high efficacy.

Consolidated Summary of Results and Conclusions of the Experiments for the Control of 'Damping Off' of Tobacco Nurseries

Mean number of surviving tobacco seedlings per sq. yd. of nursery bed

Year and date of sowing	1943 (20—8—1943)		1944 (25—8—1944)		1944 (29—9—1944)		1944 (24—9—1944)	
Venue of experiment	Sandy area Bapatla		Black soil area, Agrl. Res. Station, Guntur		Black soil area, Agrl. Res. Station, Guntur		Sandy area Bapatla	
Treatments :								
Raised beds	66·00		231·15		140·34		142·61	
Non raised beds	98·80		206·38		158·80		209·60	
Critical difference	—		—		—		—	
Conclusions	Not significant		Not significant		Not significant		Not significant	
Sterlized beds	85·65		274·95		177·625		230·71	
Nonsterilized beds	79·10		162·59		121·525		121·89	
Critical difference	—		39·86	(5% level)	25·37	(5% level)	31·73	(5% level)
—	—		56·69	(1% level)	36·09	(1% level)	39·79	(1% level)
Conclusions	Not significant		Sterilization	No sterilization	Sterilisation	No sterilization	Sterilization	No sterilization
Bordeaux mixture (A)	176·25		294·5		191·77		269·25	
Burgundy mixture (B)	* 36·47		284·44		198·15		205·85	
Colloidal copper (C)	78·22		229·46		155·31		208·39	
Control (D)	38·45		66·69		53·06		22·80	
Critical difference	83·96	(5% level)	44·16	(5% level)	27·12	(5% level)	56·69	(5% level)
	113·39	(1% level)	58·73	(1% level)	36·06	(1% level)	89·01	(1% level)
Conclusions	A C D B*		A B C D		B A C D		A C B D	

*Buisol

Therefore sterilizing the beds prior to sowing of the seeds and following it up with spraying preferably with Bordeaux mixture 1% seems to be the best way of combating the 'damping off' disease in the tobacco nurseries.

Summary: Experiments were conducted under randomised replicated split plot design for the control of damping off in the tobacco nurseries in the black and sandy soils in the Guntur District in the years 1943 and 1944. The results indicated that sterilizing the beds by burning chilli stalks in the black soil and casurina sweepings and twigs in the sandy soil and following it with spraying of the fungicides like Bordeaux mixture, Burgundy mixture or colloidal copper controlled the the disease. Of the fungicides the former two proved superior to the latter.

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Improvement of the Quality of Fodder in Periamanjal Cholam (*Sorghum durra*) in Madras State

by

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Introduction: Periamanjal Cholam is the most important unirrigated variety of Sorghum grown in the Coimbatore district. It is grown in the taluks of Coimbatore, Palladam and also parts of Avanashi, Dharapuram and Erode and occupies an area of about a lakh of acres. Botanically, Periamanjal Cholam belongs to the species *Sorghum durra, vari Coimbatoricum* (Snowden). It has yellow grains and it is much valued as food. This variety grows very tall, attaining a height of 10 to 12 feet. The straw is the mainstay of cattle in this area. Sown in the months of July—August with the break of the south-west monsoon, it comes to harvest in December—January. The Tamil prefix "Peria" denotes the long duration (135 days) of this variety, distinguishing it from the "Chinna" Manjal Cholam which is a short duration variety grown under irrigation. In normal seasons, Periamanjal Cholam yields 600 to 800 lb. of grain and about 3,000 to 4,000 lb. of dry straw per acre. The straw is pithy, but sweet and nourishing. The problem of improving the fodder of Periamanjal by in introducing juiciness into the straw was taken up at the Millet Breeding Station, Coimbatore, as an item in the improvement of the Sorghums of the Madras State.

Minerals and Methods: The varieties of Cholam grown in the State were studied in great detail to select a suitable parent with juicy straw for crossing with *Periamanjal Cholam*. In the ceded districts, (Madras, Deccan), there are a number of varieties with sweet and juicy stems which are very palatable and relished by cattle. Even rural folk in the Bellary and Kurnool districts are fond of chewing *Cholam* straw at the flowering stage. The "*Cheruku Patcha Jonna*" of Kurnool is thus a popular variety. Their yield of grain and straw is low when grown at Coimbatore. From the *Patcha Jonna* variety, a juicy stalked type A. S. 3355 (Co. 10) which showed minimum difference with A. S. 29 (Co. 1 *Periamanjal*) with regard to morphological characters was selected as a parent. The characters of the two parents are given below :—

Characters		Strain Co. 1 (*Periamanjal*)	Strain Co. 10 (*Patcha Jonna*)
1. Sheath colour	...	Blackish purple	Reddish purple
2. Midrib and juiciness	...	White (Pithy stalk)	Dull (Juicy stalk)
3. Panicles	...	Medium compact	Compact
4. Duration	...	135 days	155—160 days
5. Yield	...	600—800 lb.	300—400 lb.

Strain Co. 10 is of longer duration than *Periamanjal Cholam* its seed setting and grain yield are poor. The two types were crossed in the year 1939, and during subsequent generations, necessary selections were made to obtain pure breeding forms of Periamanjal Cholam with juicy stalks.

Results: All the hybrids had white midribs (pithy stalk) as white is a monogenic dominant to dull green (juicy stalk). In the F. 2 and subsequent generations, segregations were obtained not only for midrib colour, but also for other minor characters like the leaf sheath colour in which the parents differed. Suitable selections were made from each generation, with a view to obtain pure breeding forms with all the desired characters including the juiciness of stem and high yield of grain like the standard strain Co. 1 of *Periamanjal Cholam.* Of the several selections under study, one selection under study, one selection A. S. 8112, was evolved in this manner. It has blackish purple sheath similar to the standard strain of Periamanjal and in addition has the juicy stem. It is shorter in duration than the parents and also has other desirable characters. It is also shorter in duration than the standard Periamanjal Cholam by 10 days. This selection was put to its first yield trial in the year 1948 along with Co. 1, the standard *Periamanjal Cholam* and also A. S. 8110 another selection of a parallel cross between *Periamanjal Chotam* and T. 12 (*Tella jonna* of Bellary). A. S. 8112 and A. S. 8110 have dull midrib (Juicy stalk) and yellow grain. The first yield trial was conducted in 1948 with Co. 1 as standard, and the data gathered during three years are presented below:—

Particulars	Selections			Whether differences are significant are not	Critical difference P — 0·05
	Col. 1	A. S. 8110	A. S. 8112		
1948 Yield Trial:					
Grain yield as a % of the standard ...	100	122·9	120·8	No	
Straw yield as a % of the standard ...	100	93·1	111·3	No	
1949 Yield Trial:					
Grain yield as a % of the standard ...	100	57·1	107·1	Yes	13·7
Straw yield as a % of the standard ...	100	108 5	106·0	No	—
1950 Yield Trial:					
Grain yield as a % of the standard ...	100	126 2	113·1	Yes	20 2
Straw yield as a % of the standard ...	100	126 2	114 9	Yes	21·8

Discussion: It will be seen from the above data that selection A. S. 8112 has given as much yield of grain and straw as Co. 1, the standard *Periamanjal Cholam* strain with the added quality that it is juicy stalked and has greater fodder value. To assess the fodder value of this selection as compared to Co. 1, with regard to palatability, a feeding trial was conducted in January 1951. Two work animals were fed with 25 lb. of straw each, from each selection, and the quantity of struw consumed was recorded. The daily ration of 25 lb. of straw per animal was arrived at by previous tests with regard to the maximum quantity that a normal animal consumes. Owing to the severe borer attack on the Cholam crop in 1950—'51, the straw deteriorated and conclusive results could not be obtained in 1950—'51. It was repeated in the year 1952—'53.

Average quantity consumed

Animal No.	Col. 1	A. S. 8112
36	18·6 lb.	20·68 lb.
37	17·4 lb.	18·3 lb.

This shows that the selection, A. S. 8112 has better palatability compared to Col. the standard strain. In addition to this, chemical analysis was done to assess the comparative nutritive value of the two types of straw. It is as follows:—

Strain Co. 1	Moisture	Ash	Crude protein	Ether Extractives	Crude fibre	Carbo-hydrate	Total	Lime (Cao)	Phosphoric acid
Col. 1	6·41	10·03	2·55	1·85	40·48	55 09	100	1·17	0·46
A. S. 8112	7·52	9·76	2·45	2·16	35·09	50·54	100	0·72	0·40

In the 1951 main season, separate plots were laid out to find out the yield of green fodder of the types and the juice content of their stems. The yield of green fodder obtained from A. S. 8112 is 20,000 lb. per acre whereas the yield of Co. 1 the standard strain of *Periamanjal cholam* was 18,000 lb. per acre. Just at the time of flowering, a weighed quantity of desheathed stalks in each of the above selections was crushed to determine the juice content. The extraction percentage of A. S. 8112 was 32 and of Co. 1 26. Regarding the qualtity of juice, A. S. 8112 has higher brix, and sucrose glucose values which are as shown below:—

Selection		Percentage on weight of juice		
		Brix	Sucrose	Glucose
Co. 1	...	12·5	2 51	5·29
A. S. 8112	...	14·4	5·20	5·25

Summary: *Periamanjal Cholam* of Coimbatore district is an important variety of dryland Cholam, occupying an area of one lakh of acres in the district. The stalks of this variety are pithy. With a view to improve the fodder quality of this variety by introducing juiciness into the stalk, it was crossed with a juicy stalked type of *Cholam* from the "*Patcha Jonna*" of the Deccan. From this cross, A. S. 8112, a pure breeding superior selection with juicy stalk has been evolved. Its grain and straw yields have been found to be equal to Co. 1 the standard strain, while the quality of straw is superior to that of Co. 1 as it is juicy and also sweet. Feeding trails show that A. S. 8112 has very good palatability. Further the analysis of juice revealed that A. S. 8112 has higher brix, and sucrose contents.

Acknowledgement: Our thanks are due to Sri M. A. Sankara Ayyar, B. A., B. Sc., (Ag.) who did the original cross. Our thanks are also due to Government Agricultural Chemist for the analysis of the straw samples.

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Research Note

Cytology of a Sterile Radish Plant

In the course of *Brassica Raphanus* hybridisation (Subramanyam 1954) it was observed that in the pure line cultures of radish B. R. 11 *(Raphanus sativus)* one plant was not setting any pods. The reproductive parts were found to dry and fall-off in about 3-4 days of blooming as compared with the normal, where pod formation was characterised by the pistil remaining in position even when the petals withered away.

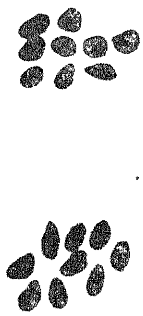

Fig 1

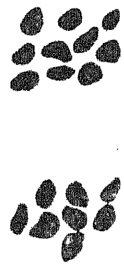

Fig 2

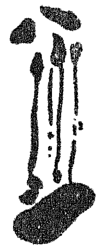

Fig 3

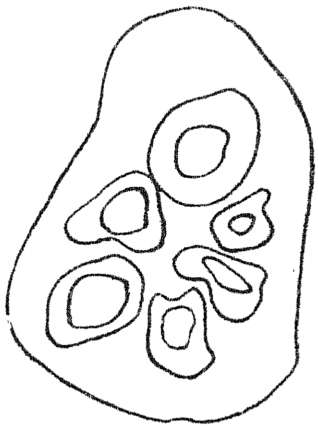

Fig 4

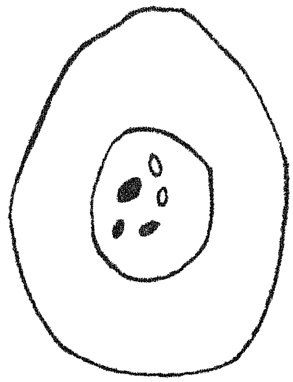

Fig 5

When the pistils of the abnormal plant, where there was no pod setting, was pollinated with fresh functional pollen from normal plants, it was not successful. Meiosis in the pollen mother cells was

studied from temporary aceto-carmine slides. The material was fixed in acetic alcohol (1 : 3) for three hours and preserved in 70% alcohol.

Chromosome counts made at different stages of division, showed 9 as the haploid number (Fig. 1). Great irregularities were noticed in the orientation of bivalents at the metaphase and in the distribution of chromosomes to the poles (Fig. 2). Fragmentation and lagging of bivalents was observed at anaphase I (Fig. 3). Distribution of chromosomes at anaphase was in the following order: Anaphase I (9—9; 8—10; 7—11; 6—12). Anaphase II (9—9, 9—9; 8—8, 10—10; 7—7, 11—11; 6—6, 12—12). 8—10 distribution was commoner than others (Fig. 2).

Aceto-Carmine smear preparations showed that pollen mother cells formed 2—6 cells (Fig, 4) in each pollen mother cell Monads also occured frequently (Fig. 5).

The data given below show that 4 is the most common number of cells per P. M. C. and the average per P. M. C. is 4·21. Giant and jointed pollen grain were also found. Pollen fertility was estimated to be 8 6% which, however, proved non-functional when pollinated to normal plants.

No. of cells per pollen mother cell.	*Frequency*	*Total*
1.	8	8
2.	33	66
3.	54	162
4.	169	676
5.	101	505
6.	73	438
Total	438	1,855

Average per P. M. C. 4·21

The writer wishes to thank Dr. S. K. Roy, Rice Specialist, Bihar for adequate facilities and Dr. U. N. Verma for going through the manuscripts and offering useful suggestions. Thanks are due also to Mr. M. Shamsuddin for help in the perparation of slides.

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Abstract

1. *Extract from the Report of the Third Meeting of the Working Party on Fertilizer of the International Rice Commission, F. A. O., United Nations, 1953.*

Rice is one of the most important food crops grown in the Indian Union. During the year 1949—'50, about 28 million hectares out of a total cultivated area of about 113 million hectares in the country had been under paddy cultivation. Paddy in India is mostly grown under rainfed conditions, especially in the eastern and southern parts of the country where the annual precipitation is at least 1,300 millimeters. About 30 percent of the rice lands have irrigation facilities through rivers, canals, wells and tanks.

The average yield of rice in India is about 800 kilograms per hectare which is about one third of the Japanese average and half the Chinese average. The main problem facing the country is to increase the total production of rice, by (a) increasing the yield per acre by suitable manurial and cultural practices, (b) using improved and resistant varieties of seeds and (c) bringing under cultivation more of the area at present classed as cultivable waste through organised soil reclamation. Increased irrigational facilities for the existing and newly reclaimed lands are expected under the multipurpose river-valley projects undertaken by the Government under the Five-year Plan.

Location and extent of rice producing areas and their average yields: The major rice growing States in India are Assam, West Bengal, Bihar, Orissa, Madras, Mysore, Hyderabad, Travancore-Cochin, Bombay, Madhya Pradesh, and to a smaller extent the Punjab.

The total paddy area in different States, and the average yields are given in Table 1. Madras has the largest area (4·2 million hectares) under paddy and the average yield per hectare is also the highest (1,143 kilograms/hectare). Bihar has the next largest area with 3·8 million hectares under paddy, but the average yield is only 698 kilograms/hectare. West Bengal, Uttar Pradesh and Madhya Pradesh have 3·1, 2·9, and 2·4 million hectares of land under rice and their average yields per hectare are 9,43,654 and 650 kilograms, respectively. Assam has about 1·5 million hectares under paddy and has an average yield of 865 kilograms per hectare. Only a quarter of the area under paddy in Bihar and one-fifth of the area in West Bengal and Madhya Pradesh have irrigation facilities.

TABLE 1

Area under paddy and average yields of rice in different States of India (Average 1936 — '46)

State	Area	Average yields
	Million hectares*	kg/ha.
Assam	1·5	865
Bihar	3·8	698
Bombay	0·8	990
Madhya Pradesh	2·4	650
East Punjab	0·2	669
Madras	4·2	1143
Orissa	2·1	672
West Bengal	3·1	943
Uttar Pradesh	2·9	654
Mysore	0·3	764

* One hectare = 2·47 acres.

While the average figures represent the average for each State as a whole, the average yields recorded at the state experimental stations are much higher than the average yield for the whole State, as will be seen from Table 2.

TABLE 2

Average rice yields of the state as a whole and of Agricultural Experiment Stations

State		Average yield of state as a whole	Average yields at experiment stations
		Kg/ha	Kg/ha
Assam	..	865	1,842
Bihar	..	698	1,338
Bombay	..	990	2,396
Madras	..	1,143	2,270
Madhya Pradesh	..	650	1,372
Mysore	..	764	2,240
Orissa	..	672	2,186
Uttar Pradesh	..	654	1,290
West Bengal	..	943	2,340

This table indicates that the average yields per state are generally about half the yields recorded at the various state experimental stations. This suggests that the yields in the state as a whole can reasonably be doubled by adopting suitable manurial, rotational, and cultural practices.

One of the most disconcerting features of the yields of the rice crop in India has been a declining tendency in the average yields noticeable from year to year as shown in Table 3. The low content of organic matter, nitrogen, and phosphorus of Indian soils, the age-old intensive cultivation to which the soils have been subjected without proper replenishment, lack of proper irrigation facilities, and occasional vagaries of climate, all contribute toward lowering the productivity of the land.

TABLE 3

Average yields of rice in India

Year	Average yield
1895/96—1899/1900	1,056
1900/01—1904/1905	1,077
1905/06—1909/10	985
1910/11—1914/15	1,010
1915/16—1919/20	1,007
1920/21—1924/25	948
1925/26—1929/30	936
1930/31—1934/35	953
1935/36—1939/40	880
1940/41	761
1941/42	866
1942/43	833
1943/44	948
1944/45	842
1945/46	824
1946/49	—
1949/50	770
1950/51	667
1951/52	706

Response to application of Fertilizers on different soils: The following broad conclusions can be drawn with regard to likely manurial requirements of India under different soil and climatic conditions.

(a) In the back soil tracts, comprising Bombay, Madhya Pradesh, Hydrabad, and Central India, substantial response is obtained with ammonium sulphate under irrigated conditions. In unirrigated areas of the tract also, the response has been encouraging but this is likely to be affected by the amount of rainfall. The reponse is substantially increased, under both irrigated and unirrigated conditions, when phosphorous in the form of superphosphate is applied along with ammonium sulphate in the ratio of 2:1. A combination of inorganic and organic sources of nitrogen has proved more useful than either source alone.

(b) In the Gangetic alluvium comprising Bihar and Uttar Pradesh, positive response with ammonium sulphate has been obtained under irrigated conditions, which is substantially increased when supplemented with phosphates in the ratio of 1:1. Significant response under unirrigated conditions was obtained when combinations of nitrogen and phosphates were applied. Phosphates alone did not prove useful.

In Uttar Pradesh, universal response has been obtained with ammonium sulphate and other forms of nitrogen. The value of applications of phosphates alone or in combination with nitrogen has not been establised.

(c) In the Indus alluvium, soils appear to be deficient, in the Punjab, in both nitrogen and phosphorus. While response to either of these alone is obtained under both irrigated and unirrigated conditions, combinations of nitrogen and phosphate have enhanced this response.

(d) Mixed red and black lateritic soils exist in Bengal, Orissa, Madras and Mysore. In West Bengal where the soils are mostly old alluvium and laterite, paddy responds to ammonium sulphate, but best results are obtained with ammophos, bonemeal, or niciphos where both nutrients nitrogen and phosphate, are present. In Madras and Mysore, where red, black and lateritic soils occur together with some deltaic areas, paddy responds well to ammonium sulphate. The effect of supplementary phosphate is not established. In Orissa (alluvial and lateritic soils), in general, a combination of nitrogen and phosphate appears to be necessary for obtaining inceased yields of paddy.

Response to Different Fertilizers: In general nitrogen alone, either as ammonium sulphate or calcium cyanamide, has given a significant increase in the yield of paddy. A review of the past manurial experiments with paddy in India stresses the great need for the application of nitrogen in some form or other. The response to nitrogen is practically universal. Nitrogen at 22 kilograms/hectare (20 lb./acre) appears to be the minimum dose and it can be profitably increased to 67–90 kilograms/hectare (60–80 lb./acre), particularly when the average level of fertility is high.

Sulphate of ammonia finds the most universl application at the rate of 22·34 kilograms/hectare (20–30 lb./acre) of N. The response varies from 10–70 per cent over no manure, the average being 30–50 per cent. Cyanamide and nitrates of sodium and potassium have been used less frequently and the results indicate that they are not so good as sulphate of ammonia.

Indigenous oil cake, like that from groundnut, castor, beans, and mustard seed, has given significant increases in yields. Comparing oil cake and ammonium sulphate on the same nitrogen basis, there is difinite indication that oil cake is as good as, or often better than ammonium sulphate. Experiments with mixtures of green manure, oil cake and ammonium sulphate indicate that a particular level

of nitrogen can more profitably be achieved by a combination of ammonium sulphate with green manure. Due to a generally lower humus content in tropical soils, it is usually recommended to apply inorganic fertilizers like ammonium sulphate in combination with bulky organic manures.

Response to phosphate alone: The most popular phosphatic fertilizer is superphosphate containing 15—40 percent water soluble P_2O_5. Other forms of phosphates like phosphate nodules, rock phosphates and basic slag have not found much use due to their insoluble nature. Except in some cases, there is a low response to the application of phosphate alone to paddy.

The results from the application of phosphatic fertilisers are somewhat conflicting and wherever there is some response, the order is also low (8 percent increase in yield over control). Though most of the Indian soils are known to be very low in available phosphoric acid content, it appears that due to the low nitrogen content, single application of phosphates does not prove helpful to the plants. Generally when a response to phosphate is indicated, it occurs when phosphate is applied in combination with nitrogen, either as inorganic fertilizers or in the form of bulky organic manures.

Response to N. plus P. Combination: Nitrogen and phosphates in combination have been found to be useful and have been widely applied either as superphosphate mixed with any of the above nitrogenous fertilizers or as ammonium phosphates.

The doses of N. and P. vary according to their content in different fertilizers but it appears that N. plus P_2O_5 each at about 34 kilograms/hectare (30 lb./acre) is a very profitable dose.

On the lateritic soils of the coastal areas of Bombay, the application of bonemeal with nitrogenous fertilizer to provide N at 36—72 kilogram/hectare (32—64 lb./acre) gave positive responses. A linear response to increased doses of nitrogen was observed in these areas but for P_2O_5 the optimum was found to be about 72 kilograms/hectare (64 lb./acre) and P_2O_5 at 72—108 kilograms/hectare (64—96 lb./acre) gave positive responses. A linear response to increased doses of nitrogen was observed in these areas but for P_2O_5 the optimum was found to be about 72 kilograms/hectare (64 lb./acre).

Other combinations like that of N. plus K. and P. plus K. have failed to give any positive results. The complete fertilizer (N. plus P. plus K.) is not much used. Potash in general does not appear to play a significant role either alone or in combination with nitrogen or phosphorus.

Manuring practices and possible yield increases: Manuring is one of the chief factors that go to increase the crop yield. The possible yield increases in different states vary considerably and for applications of N. alone and N. plus P. the following increases can be generally expected in different States of India (Table 4).

TABLE 4

Possible yield increases from applications of N. alone and in combination with P. in different States of India

State	N.	N. plus P.
	hg./ha.	hg./ha.
Assam	120	295
Bihar	102	332
Bombay	222	305

	kg./ha.	kg./ha.
Madras	102	194
Madhya Pradesh	222	305
Mysore	157	203
Orissa	342	342
Uttar Pradesh	55	323
West Bengal	139	258
Average	162	286

Thus in India an increase of about 116 kilograms (225 lb.) in the yield of paddy is generally obtainable by combined application of nitrogen and phosphate, nitrogen being applied partly in the organic and partly in inorganic form. Most of the experiments have shown that combined applications of organics and inorganics have generally given better response than either one singly.

Extent to which Recommended Practices Are Used: At present in India, only a small fraction of the total area is having the benefit of manures and fertilizers. The indigenous manures are inadequate and the use of fertilizers has not been widely adopted. The main handicaps to the more extensive use of fertilizers are the very limited economic resources of the cultivator and his ignorance regarding the beneficial effects of the application of fertilizers. In order to stimulate low production through increased fertilizer usage, the cultivator's requirements of cheap credit must be adequately provided for. Additional stimulus to fertilizer consumption can also be given by subsidy programs, where the alteration of an unfavourable cost benefit ratio is necessary. An extension of the demonstration and propaganda field tests would also be of great importance, as would the provision of supplies of fertilizer for demonstration by the cultivators.

Under the five year plan, the consumption of nitrogen and phosphatic fertilizers, namely ammonium sulphate and superphosphate, is expected to increase year after year, this increase in consumption is only possible if sufficient attention is paid to demonstration combined with propaganda. Side by side with increased consumption, it will be necessary to make provision for meeting the demand for increased supplies, and the desirability of expansion of production must be considered.

Investigational Work Planned to Evaluate Soil Fertility Conditions as a Basis for Making Manurial Recommendations: On the recommendations of A. B. Stewart, the Indian Council of Agricultural Research has sanctioned in several states a scheme of simple trials on the fields of cultivators with known fertilizers with the double object of (a) determining the fertilizer needs of soils and finding the average response to a particular manurial supplement, and (b) enabling the scientists to study the interaction of this response with the local variations within the tract. This information will form the basis for making practical recommendations applicable to specific conditions.

In addition to the above experiments, under the United States Technical Co-operation Administration Program, statistically laidout agronomic trials have been started from Kharif 1953 in 15 paddy centres throughout India with new fertilisers: urea, nitrophosphate, ammonium phosphate, double superphosphate and ammonium sulphate. The object of these experiments is to determine by actual field tests the response of crops to the application of new fertilizers under the different soil and climatic conditions in different parts of the country.

Furthermore, in order to make the farmers fertilizer-minded and to popularise the use of new fertilizers in the country, it is planned to have cultivators lay out trials as extensively as possible, with new fertilizers, so that they will be convinced of the performance of these fertilizers. About 10,000 trials are being planned under this scheme. [A. M. K.]

2. Studies on Neyveli lignite, Palaniappan, N. P., Murthy B. S., J. of Annamalai University. XIX P. 166. 1954

This gives the systematic investigation of the limits of usefulness of lignite as a source of producer gas. Two aspects have been studies. (1) The inherent qualities of lignite and its char justifying its use for the said purpose. (2) the constructional details of a plant that could utilise to the maximum the available essential fuel qualities of this indigenous lignite. Information regarding first aspect got by analysing the lignite and its char. 7 samples from bore holes of different depths analysed. Analysis conducted as per Fuel Res. Publication No. 44. H. M. Stationary Officer. Calorific value using Parr oxygen calorimeter. Analysis show that on air dry basis the average composition is moisture 10·25%. Volatiles 48·31%. Fixed carbon 36·75% ash 4·39% sulphur 1·41% Cal. value 9,300 B. T. V./lb. and is suitable for producer gas production. [A. M. K. and S. V.]

3. Notes on Lychee Grafting. By Roy O. Nelson. Florida Sub-Tropical Gardener. Vol. 3. Page, 13 and 30. February 1955

Budding and grafting trials at the University of Miami Experimental farm on seedling lychees ¼ inches in diameter, using chip buds, shield buds, and veneer grafts have given successful "takes" and subsequent springing of buds. These grafted trees, now 14 months from grafting, average ½ inches in diameter and 24 inches in height. Proper selection of graftwood appears to be of more importance than either the method of grafting or the condition of the stock in the success of the operation. The parent trees from which the graftwood was selected had been forced into a condition of vigorous growth by ample quantities of fertiliser and water. The methods of graftage used were the conventional shield bud, chip buds, and side veneer grafts. Also used was a slight modification of an eye bud cut in a manner similar to that used in guava graftage. This type of scion cut has an advantage over the methods in that the bud eye may be wrapped in a manner so that a slight opening can be left at the top of the wrap. This will enable the bud to emerge before the wrap is removed. Vinyl plastic film ·0035 inch thickness cut in ½ inch wide strips were used for wrapping the buds in a shingle-like manner wrapping upward and finishing the wrap by under-looping the end of the film as is done when using a rubber grafting strip. The lychee, being slower in growth habits than the citrus, should not be lopped over until one month after the graftage operation.

ORTHOCIDE 75 Seed Protectant is a new organic chemical (N. Trichloro-methymercapto-4-cyclohexene-1·2-dicarboximide). It has been tested and used as a seed protectant on a wide variety of seeds in all kinds of soils, weather and temperature conditions. It has proven to be very effective protecting seeds against seed and seedling rots. [N. V. S.]

Gleanings

Renovation of Citrus Trees: Citrus trees tend to lose vigour as they grow older. This condition is not always confined to old trees and can occur at varying ages as a result of any of several causes :—

Root Root;
Defective underground drainage;
Virus diseases;
Inadequate or unsuitable fertiliser;
Poor cultural practice;
Loss of surface soil;
Faulty irrigation method;
Difficulty in meeting the needs of aged trees for plant food and moisture;
Trace element deficiencies and
Insect pests.

Root Rot: Trees affected by phytophthora root rot, a disease responsible for citrus tree decline to a greater extent than any other single cause, are not good subjects for renovation.

This disease attacks trees on the susceptible rough lemon (citronelle) and sweet orange rootstocks, but trifoliata rootstock is highly resistant. Citrus tree decline resulting from attack by this disease can be satisfactorily dealt with only by removal of infected trees and replacement with trees on the resistant trifoliata rootstock. Preferably draining should precede planting.

Defective Drainage: Citrus trees thrive best on soils that are naturally well drained. It does happen that land with fair drainage in only normal seasons has to be included in a planting programme. Land of this type presents serious problems in wet seasons or under irrigation. The soil becomes water-logged for periods in wet seasons or water tables may develop under irrigation, due to the presence of an impermeable subsoil. Underground drainage installed at the outset in land of this type can avert serious damage to the trees. Many instances can be quoted of mature thriving orchards on land of this type virtually collapsing in the summer following a wet season as a result of root damage sustained in the water-logged soil. Usually phytophthora root rot will be found associated with conditions of poor drainage if the trees are on susceptible rootstocks. Phytophthora resistant rootstocks are not the complete answer to faulty drainage, and best results will not be achieved if the soil becomes waterlogged for even short periods of time, irrespective of the rootstock used.

Virus Diseases: From about the seventh year onwards the trees become less vigorous, fruit size suffers, and increased applications of manure have no effect. The cause of this condition has been determined as a virus disease which produces the symptoms of unthriftiness in association with rough lemon rootstock. Solution of the problem lies in propagating these varieties on the tolerant sweet orange or trifoliata stocks. Affected trees on rough lemon cannot be rejuvenated and replacement is necessary.

Scaly Butt: Another virus disease resulting in severe stunting is that producing the scaly butt symptom on the stock portion of the tree when the stock is trifoliata. Trees stunted by this disease cannot be improved by any known treatment. Correction lies in removing trees as soon as the stunting symptom is recognised and replacing with trees propagated from scaly-butt-free parents.

Stem Pit: Affecting grapefruit chiefly, the stem pit virus reduces tree vigour and the fruit becomes small with an abnormally thick rind. Trees showing symptoms of the disease do not respond to treatment and solution of the problem is to remove the trees.

Shell Bark: This disease, also a virus, affects lemons, and symptoms show as gumming on the trunk above the bud union, and, at times, extending into the main branches.

This disease is often confused with collar rot which also kills the bark on the trunk. Drought effects intensify the symptoms and treatment should include adequate irrigation during dry weather. This, together with ample applications of fertiliser, will keep the treés in commercial production up to the age of 20 to 25 years, when consideration should be given to their replacement.

Psorosis or Scaly Bark: This is another virus disease responsible for a decline in tree vigour. This disease is usually transmitted in the buds, which emphasises the necessity for certified parent trees as a source of bud supply. There is no treatment effective in restoring infected trees to full health.

Manuring: Loss of vigour is easiest to correct when it is the result of inadequate or faulty manuring. Citrus trees require the basic plant foods, nitrogen, phosphoric acid and potash, for satisfactory growth. Some soils are supplied with potash in sufficient amount, but many other citrus soils are lacking in all trees. Therefore, the use of mixed fertilisers is favoured in many districts.

Nitrogen: Citrus trees require relatively large quantities of nitrogen. Insufficient nitrogen is quickly indicated by yellow leaves and poor growth. The nitrogen requirements of citrus trees may be as high as 2 lb. actual nitrogen per tree per annum. Only large trees would require this amount. but 1 lb. to 1½ lb. is required by trees of average size. The availability of nitrogen to the trees following application varies according to the material used (assuming soil moisture is present) from immediately in the case of nitrate of soda to a few weeks in the case of sulphate of ammonia and rather more slowly in the case of castor meal and other fertilisers. Weeds or cover crops provide a good guide to nitrogen requirements. If they are poor in colour and growth then nitrogen is likely to be in short supply.

Phosphates: Phosphoric acid is essential to citrus tree nutrition, though immediate or observable benefits seldom follow its use. However, when phosphoric acid is inadequate trees tend towards heavy spring leaf-fall, some terminal leaf browning may occur, and the fruit will show a rind coarseness with a tendency to open centres. When mixed fertilisers are used, or when liberal applications of phosphate (2 to 5 cwt. per acre) are made to green-manure crops, the phosphate requirement is adequately met in most soils.

Potash: While essential to trees and plants, the application of potash, unlike nitrogen, produces no spectacular result. Most loam and clay soils do not seem to benefit from its use and plants appear to be able to secure sufficient when grown in soils of these types.

Fertiliser should be applied to citrus trees generally before the beginning of spring growth and in time for the plant foods supplied to become available. A second application towards the end of summer helps to promote a good autumn growth. Where circumstances permit, light and frequent applications offer an advantage over heavier, infrequent dressings.

Conditioning: Citrus trees to be severely pruned as part of the renovation treatment, should be given an adequate fertiliser dressing sometime beforehand.

The root system of citrus trees can be extensive but, in the majority of cases, and almost invariably in the case of trees requiring renovation, a large proportion of the fibre roots will be found under the limb spread. This makes the placement of a proportion of the fertiliser to the area under the tree worth while. Land which has been cultivated for a long time tends to become deficient in organic matter and this is to be replaced. Correction becomes necessary and this may be accomplished by the application of organic manures or the use of cover crops. Organic manures—cow, horse, sheep, and poultry—may be applied at rates ranging from 5 to 8 tons per acre for cow manure down to 2½ tons in the case of poultry manure. Unfortunately, supplies of organic manures are not usually available in the quantities required.

Lime: Benefit can be derived from the use of agricultural lime in highly acid soils, such as occur in many parts of the high-rainfall districts, or in soils that have been acidified by continual applications of sulphate of ammonia (either by itself or in fertiliser mixtures). In most cases where acid soils occur it is common to find the trees suffering in varying degrees from magnesium deficiency. It is good practice, therefore, to apply dolomite lime rather than carbonate of lime (agricultural lime). Dolomite contains magnesium and assists in correcting the deficiency, while the lime content corrects the acidity problem.

Cultural Practices: The old custom, now largely discarded, of frequent cultivation in the belief this was necessary to retain moisture in the soil, is harmful in the long run because of its effect in breaking down soil structure and hastening the loss of organic matter. Some cultivation is necessary in the great majority of cases, but this should be no more than the minimum necessary to keep competing weed growth in check during the drier months of the year. The only exception to this rule is when an undesirable grass or weed appears and its eradication makes more frequent cultivation necessary for a period. Depth of cultivation is important, particularly when it is realised that a large proportion of the citrus tree's root system is within the top 12 inches, in deep soils, and, in shallow soils may not be deeper than 8 or 9 inches. Consequently, cultivation should be as shallow as possible, consistent with effective weed control.

Irrigation: The ideal in irrigation is to maintain sufficient soil moisture in the root zone of trees, avoid over-wetting the land and, at the same time, ensure that all trees receive enough for their requirements.

Plant Needs: Difficulty in meeting the moisture and food requirements of the trees is sometimes seen in the coastal districts, where the soil is shallow. It occurs only in the older plantings where tree development has been good during the earlier years and when the seasons were favourable. This condition is readily corrected by a programme involving severe pruning in the late winter or early spring. Preparation before pruning, in the shape of a liberal application of fertiliser is necessary, and this, applied early in the winter and followed by effective weed control, puts the trees into a condition where a rapid response to pruning can be expected.

Pruning: The pruning method used will vary slightly between varieties. In the case of oranges and lemons all minor branches are first removed, leaving the main frame of larger limbs. Next remove all limbs tending to a vertical position at their base, retaining, where possible, the limbs tending to a horizontal position. Then cut the limbs retained at a point where the limb diameter is ¾ inch to 1 inch. Some flexibility must be used in deciding where to make the terminal cut, as all trees do not necessarily make uniform growth on all sides. It is, then, sometimes necessary to retain a weaker limb than is desirable to fill

a weak quarter. The terminal cutting will be carried out so that a reasonable general confirmation of the tree is obtained. No growth-carrying foliage is allowed to remain. Even young shoots of reasonable vigour should be removed, except in the case of mandarin varieties, when the limbs or twigs forming the skirt or lower branches of the tree should not be pruned at all. Treatment of the rest of the tree will follow similar lines to that described for oranges, except that the vertical growth habit of some mandarin varieties will prevent the horizontal trend being achieved to the same degree. Serious die-back may occur from the terminal cuts if all foliage is removed in the manner employed for oranges and lemons.

After Treatment: In coastal districts it is good practice to spray, immediately after pruning, with lime sulphur at a strength of 1 in 12. This spray is designed to control white louse scale and kill any moss or lichen. If the weevil known as "Dicky Rice" is prevalent then the DDT spray at 0·1 per cent., applied twenty-one days after pruning, will effectively control this pest which, if not checked, can prevent limbs or whole trees from breaking into new growth. DDT sprays are not advisable at later stages, because of the danger of a heavy infestation of red scale, which often appears after this material is used. If Dicky Rice activity occurs after new growth has appeared the spray should be confined to the lower limbs and trunks, and not applied to the rest of the tree.

Thinning: A large number of new shoots appear some three or four weeks after pruning. These usually extend only 8 to 12 inches before maturing. Shortly after this stage a second growth is made by a percentage of the earlier shoots. This growth is vigorous and may extend 3 to 4 feet length. At this stage a temptation to thin out the new growth should be resisted. The trees need all the leaf surface possible at this stage. Also, the shoots which fail to make vigorous extension growth will, if allowed to remain, produce a crop of fruit much sooner than the stronger growths Thinning is better left until the weaker shoots commence to die as a result of excessive shading. If necessary, skeleton pruning may be repeated several times. Usually it is not necessary to repeat more often than every five or six years. Pruning of this nature results in the loss of one crop and production commences again in the second year. However, there are times when it may be deferred for another year.

Minor Elements: In addition to the major plant foods – nitrogen, phosphoric acid and potash – trees require small quantities of what are termed "minor elements". Some of these are needed in extremely small amounts but, when the supply is inadequate' tree growth is restricted, sometimes to the point of causing the trees to die back. Deficiencies most common in citrus are copper, zinc, magnesium and manganese. Less commonly encountered are deficiencies in iron, calcium and boron. Copper, zinc and magnesium deficiencies can restrict growth very considerably, but manganese deficiency has to be severe before growth is materially affected. It will be evident that trees suffering from deficiency complaints must first be treated for the deficiency concerned before restoration to health can be expected.

Insect Pests: Tree condition can be adversely affected by insect attack, even to the point where limbs, and at times the trees, are killed. Pests, which can be classed as severely damaging to tree health are red scale, purple scale, and white louse scale. These scales are often responsible for considerable limb die-back and red scale has been known to kill young trees outright. White louse is seldom a pest on young trees but can be the cause of limb die-back in older trees. Other scale insects, such as brown scale, soft brown scale, and white wax scale, can restrict growth but are rarely responsible for the death of twigs. Bronze

orange bug can cause partial defoliation and loss of vigour in trees when the bugs occur in sufficient numbers. Both bronze orange bug and crusader bug cause considerable die-back of young shoots with a consequent stunting effect on tree development. Tree recovery cannot be expected until the pests are controlled. Fruit tree root weevil, attacking the roots of citrus trees in its larval stage, causes a marked loss of vitality in the trees infested. Growth diminishes, foliage becomes sparse and of small size, and fruit production declines. This weevil feeds on the foliage as an adult but damage of this nature is usually so slight as to pass un-noticed and the first obvious indication of presence of this pest is in the other wise inexplicable loss of vigour in the trees. The weevil favours the heavier type soils and is seldom seen on the lighter sandy soils. It is usually at its worst in the deeper soils. It is highly desirable that this weevil be recognised in the early stages, preferably before the tree's condition indicates its presence. Consequently, a watch for adult weevils on the trees during the spring and summer should be maintained and, if found, specimens forwarded to the Department of Agriculture for identification and advice on control. Dicky Rice weevil is very much smaller than its relative, the fruit tree root weevil, and is often overlooked, but the effect on the trees and fruit is quite obvious.

In this case it is the adult weevil which is responsible for restricting growth by feeding on the shoots as they emerge from the buds. This damage can proceed to point where growth is entirely prevented. It will feed on the margin of more mature leaves giving them a fringed effect. It also feeds on the young developing fruits, producing white mark on the rind which latter turn dark to form a blemish which lowers the appearance and value of the fruit. This weevil can prevent new growth appearing on either part or the whole of a tree which has been skeleton pruned. Being nocturnal in habit and quite small, it is often difficult to find specimens of this weevil but the damage to foliage, fruit and new shoots is so characteristic that these symptoms are usually sufficient to determine its presence. Fuller's rose weevil is another of the weevil group. Midway in size between the Dicky Rice weevil and the large fruit tree root weevil, this adult feeds on the foliage quite freely, and, confining its feeding chiefly to the leaf margins, gives them a scolloped appearance as distinct from the fringed effect produced by the smaller Dicky Rice. Nocturnal in habit, feeding is concentrated on the lower branches at first and the damage to the leaves is the obvious sign that the pest is present. Citrus Bud Mite, attacking the growth buds before new growth begins, is the cause of distortion which interferes with normal shoot development. Trees heavily infested become so seriously distorted in the growth terminals that skeleton pruning (described elsewhere in this article) is justified. This, followed by spraying, enables the trees to make a fresh start with normal growth. It is the damage to embryo fruits by this mite which results in the grotesque shapes sometimes seen in lemon fruits and, much less frequently, in oranges. Usually fruits and thus escape notice, but the occasional specimen which remains to maturity cannot escape attention. So, in addition to deforming and checking growth, this pest can also be responsible for a reduction in the crop.

(Australian Agrl. Newsletter No. 470) [A. M. K.]

Cotton in rice fallows. Does it impair soil fertility? Growing of cotton in the rice follows in the districts of Tanjore, Tiruchirapalli and South Arcot is coming into vogue and gaining popularity among the ryots. It is estimated that in the coming season over 10,000 acres will be sown to cotton in places where irrigation facility exists. However, it may be argued that the fertility of the soils may be depleted to the detriment of the succeeding paddy crop by adopting this practice of raising cotton in rice fallows. This point was not lost sight of and actual soil analyses were carried out both before and after dropping to ascertain

the actual state of affairs. Soil samples were drawn, both from the fallow and from where cotton was raised at three different depths, namely, 0-6", 6-12" and 12-24" at a number of places in three districts, where these trials are in progress. The samples were examined for the essential plant nutrient contents nitrogen and phosphoric acid. The results of such analyses reveal that there is some slight depletion of nitrogen in both the cotton and the fallow fields at the end of the cotton season. The depletion of nitrogen is however, greater fn the fields where cotton is grown. This reduction in the nitrogen content is noticed mainly in the deeper layers of soil while there is not much difference in the surface soil. This point is conceivcable as the cotton plant has a deeper root system and is able to obtain its nutrient requirements from the lower layers. Even the little removal of nitrogen in the surface samples by the crop in its early growth stages is made good to some extent by the leaves shed by the crop. The slight depletion in the nitrogen content in the top soil is not of much significance to affect the yield of the succeeding paddy crop which can be easily raised with the incorporation of green manure and ammonium sulphate as is the practice everywhere. Regarding, the available phosphorus, it is seen that there is no loss generally in all places and, in fact, in most instances, there is more of available phosphates left behind after a crop of cotton. Thus it is clear that cotton growing in the rice fallows is not deterimental to the paddy crop that follows it, provided adequate manuring with green leaves and ammonium sulphate, is resorted to as per usual practice in those areas. The above note is based only on the data collected in 1954.

(D. A's. Agrl. News. Letter June 1955). [A. M. K.]

Successful Candidates in the B. Sc. (Ag.) Degree Final Examination held in April, 1955 by the University of Madras

Abdul Latiff, A., Abdul Samad, N. M., Achutha Kurup, K., Alagappan, RM., Alfred, J. M., Andrade, F. O. C., Andrew Desabanthu Devotta, Arunachalam, M., Arunachalam, V. G., Balakrishnan, C., Balasubramanian, V. P., Chellappa, K. K., Chinnaswami, M., Dharmaraj Moses, J., Dinakaran, M., Doraiswami, M., D'Souza, S., Gangadhara Varman, V. N., George, A. J., Govindan, K., Govindarajan, M., Gunachandran, P. N., Gunaseelan, L. M., Indran, M., Iruthaya Raj, M. R., Jose, P. C., Kadambavanasundaram, M., Kannan, S., Karunakar Shetti, B., Kolandayappan, K. A., Krishnama Raju, A., Kumaran, V., Madhavan, O. T., Meenakshisundaram, V., Mohd. Abdul Khader, J. B. M., Mohd. Azam, C. A., Mohd. Ghouse, I., Muthiah M., Narayanan, B. L., Narayanan, P. K., Natarajan, V. R., Panchapakesan, V., Periaswami, M., Periaswami, N. K., Picardo, W. I. M , Ponnuswami, S. V., Poonacha, B. A., Premnath Alwa, M., Prince, S., Radhakrishnan, S. A., Ramachandran, C., Ramachandran, S., Ramiah, S., Samraj Daniel, J. C., Samuel, T. V., Sankaran, S., Sasibhushana Menon, M., Sokkappan, S., Sellanna Goundan, V. R., Shanmugavelu, K. G., Shivarama Rai, P., Soundirarajan, V. V., Sriram, T. A., Bernard, S. F., Subramaniam, S. (Sundaram), Subramanian, S. (Swaminathan), Subramanian, T. L. Sundaravaradan, S., Thanikachalam, T., Thyagarajan, N., Thyagaraj, R. S. T., William Odongo Omamo, Xavier, T., Seemanthini, B., Sukanya Bai, M. V., Antony, C. R., Kanakasabapathy, T., Munuswami, A., Premanandan, P. P., Rajendran, G. K., Ramadas, N., Ramakrishnan, C., Ranganath Prabhu, K., Ravindranatha Menon, C., Sadagopan, V., Srinivasan, V., Swaminathan, R., Thulasi Rao, N.

Weather Review — For the month of May, 1955.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January	Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam)	6·2	+ 5·2	12·8	South	Madurai	2·9	+ 0·2	8·0
						Pamban	0·6	— 0·4	13·7
						Koilpatti*	0·7	— 2·3	8 7
	Tirurkuppam*	6·1	+ 3·8	12·6		Palayamcottai	0·3	— 1·3	9·3
	Vellore	7·6	+ 5·3	10·0					
	Gudiyatham*	4·0	+ 1·7	6·4		Ambasamudram*	2·7	+ 1·1	14·0
East Coast	Palur*	14·9	+10 5	22·3	West Coast	Trivandrum	17·3	+ 8·5	23·1
	Tindivanam*	6·9	+ 5·7	9·6		Fort Cochin	29·0	+17·3	37·1
	Cuddalore	15·3	+14·3	20·8		Pattambi*	17·3	+11·6	22·5
						Kozhikode	28·6	+19·7	36·4
	Nagapattinam	5·7	+ 4·1	13·9		Taliparamba*	30·0	+24·4	31·7
	Aduturai*	9·7	+ 8 0	15·5		Wynaad*	17·2	+ 1·3	26·5
	Pattukottai*	2·3	+ 1·1	8·2		Nileshwar*	29·6	+23·9	32·6
						Pilicode*	32·1	+26·9	35·0
Central	Salem	6·7	+ 2·1	11·1		Mangalore	14·9	+ 7·2	15·8
	Coimbatore (A. M. O.)*	4·7	+ 2·4	8·0		Kankanady*	14·6	+ 9·4	15·8
	Coimbatore	5·4	+ 2·9	10·4	Hills	Kodaikanal	9·1	+ 2·7	27·5
						Coonoor*	4·5	+ 1·0	16·5
	Tiruchirapalli	5·8	+ 3·2	10·9		Ootacamund*	20·4	+ 13·8	27·8
						Nanjanad*	16·9	+11·5	22·5

Note:— *Meteorological Stations of the Madras Agric. Dept.

The month began with localised thunder showers in Malabar and South Kanara districts. Weather became disturbed in the south west Bay of Bengal on 2—5—1955. Till 5—5—1955 rains were fairly widespread along the West Coast and light and local in Tamilnad. About 200 miles south-east of Masulipatnam a depression was noted at 08-30 hours I. S. T. on 6—5—1955. On the next day, it intensified into a cyclonic storm and moved north-west and finally became feeble on the third day. Fairly widespread showers were received at a few places in Tamilnad on 8—5—1955. In the succeeding eight days there were no large changes in weather conditions.

On 17—5—1955 a depressian was noted about 250 miles to the east of Cuddalore. Associated with it widespread and locally heavy rain fell in Tamilnad and also in the districts of Malabar and South Kanara. It crossed coast between Cuddalore and Madras and was centred some 30 miles inland on 18—5—1955, on which day heavy rains were received in the region. On the third day, it became a diffused low pressure area extending from west Tamilnad to south Deccan. During the period 20—5—1955 to 25—5—1955 only the west coast districts received rains. On 26—5—1955 weather became mainly dry over the region. Rains were fairly widespread in Malabar and South Kanara and light and scattered at a few stations in Tamilnad on 27—5—1955. The very next day a trough of low pressure was noted in the Arabian Sea off the Malabar—Kanara coast and a temporary advance of the monsoon also took place on the same day. Within two days the monsoon became active in the West Coast and remained so, till the end of the month.

The note-worthy rainfalls and the zonal rainfall in inches are furnished hereunder :—

Note-worthy Rainfalls			Zonal Rainfall			
Date	Name of Place	Rain-fall	Name of Zone	Average rainfall for May, 1955	Depar-ture from normal	Remarks
10/5/55	Tiruchirapalli	3·0	North	6·0	+ 4·0	Above normal
12/5/55	Alleppey	4·1				
17/5/55	Madras (Meenambakkam)	4·0	East Coast	9·1	+ 7·3	,,
18/5/55	Madras (Nungambakkam)	3·0	Central	5·7	+ 2·7	,,
18/5/55	Cuddalore	9·0	South	1·4	— 0·5	Below normal
,,	Salem	3·0				
19/5/55	Ootacamund	7·0	West Coast	23·1	+ 15·0	Above normal
,,	Kozhikode	6·0				
,,	Fort Cochin	6·0				
21/5/55	Palghat	5·0	Hills	12·7	+ 7·3	do.
30/5/55	Mangalore	3·0				

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 7—6—1955.

C. B. M. & M. V. J.

Departmental Notification

Gazetted Service — Postings and Transfers

Name and present post	Posted as
Bhavani Shanker Rao, Paddy Specialist, Coimbatore,	Millets and Pulses Specialist, Coimbatore.
Gopalan Nair, T., Banana Res. Officer, A. D. T.,	Horticulturist and Prof. of Horticulture, Coimbatore.
Kuppuswami, B. S., Asst. in Fruits, Coimbatore,	Asst. Fruit Specialist, Coonoor.
Kanakaraj David, S., Lecturer in Ento. Coimbatore,	Crop and P. P. O., Ento., Coimbatore.
M. Basheer, Crop and P. P. O., Coimbatore,	Lecturer in Entomology, Coimbatore.
Samuel Sundararaj, J. Asst. Fruit Specialist, Coonoor,	Banana Research Officer, A. D. T.
Venkatakrishnan, G., Principal, Basic Training School, A. D. T.	D. A. O., Salem.

Upper Subordinates — Postings and Transfers

Name and present post	Posted as
Athmaraman, P. S., S. D. A., Pattukottai,	P. A. to D. A. O., Cuddalore.
Balasubramaniam, R., Asst. in Vegetables, Coimbatore,	P. P. A. Myco. Pattukottai.
Chandrasekharan, N. R., Oil Seed Asst., Bhavanisagar,	Asst., Groundnut Breeding Station, Tindivanam.
Gopalakrishnan, K., A. D., Chowghat,	Spl. A. D., Com. Project, Palghat.
Govindarajan, T. R., Paddy Asst., P. T. B.	Paddy Asst., Aduthurai,
Krishnamurthy, P. A., Sugarcane Liaison Farm, Nellikuppam,	Sugarcane Asst., Gudiyattam.
Narayanakutti Nair, Field Supervisor, Kozhikode,	Horticultural Asst., Coimbatore.
Pranarthharthiharan, F. M., Orthanad,	A. D., Hosur.
Pattathan, B. N., A. D., Puthur,	A. D., Kasargode.
Ramana, G. V., A. D., Attur,	P. A., to D. A. O., Trichy.
Rajagopala Reddy, V., Paddy Asst., Pattukottai,	Paddy Asst., Coimbatore.
Ramakrishna Sarma, A. D., Kasargode,	A. D., Balthamagady.
Rajappan, P. V., Field Officer, Cannanore,	Fruit Asst., Coonoor.
Ramachandran, S., Extension Officer, Sankarankoil,	A. D., Madurai.
Shaukatali, K. A., A. D., Karaikudi.	A. D., Grama Sevak Training Centre, Kallupatty.
Sampath, V., Fruit Asst., Coonoor,	Garden Overseer, Ootacamund.
Subramaniam, C. L., Asst in Myco., Coimbatore,	Asst. Myco. Sugarcane, Palur.
Sadashiva Shetty, A. D., Balthamgady,	A. D., Puthur
Subramaniam, P. T., Field Supervisor, Cannanore,	Res. Asst., Fruits, in Botany, Coimbatore.
Vittal T. M., F. M., Nellikuppam,	Spl. A. D., Sugarcane, Cuddalore.
Vaidyanathan, J., Spl. A. D., Cuddalore,	Spl. A. D., Vellore.
Venkatarangam, R., Spl. A. D., Sugarcane, Vellore,	Sugarcane Asst., Palur.
Viswanathan, P. S., Asst. in Paddy, P. T. B.,	Chemistry Asst., Coimbatore.
Vasudevan, K. V., A. D., Arasampatty,	A. D., Chowghat.

DISTRICTS
S. ARCOT; COIMBATORE
MALABAR; S KANARA
RAMANATHAPURAM
TIRUNELVELI
NORTH ARCOT

MARKET COMMITTEES CHRONICLE
DEVOTED TO A FACTUAL RECORD OF SERVICE FOR REGULATED MARKETING

CROPS
COTTON; GINGELLY
GROUNDNUT
COCONUT
ARECANUT
TOBACCO

Review of Market Conditions for Commercial Crops in the Areas of Market Committees during May, 1955

I. **Cotton**: (In this Section: Candy = 784 lb, Bale = 392 lb., Pothi = 280 lbs.) The cotton market at Tiruppur continued to be brisk during the month. The market started with a carryover stock of 9902 candies of Cambodia lint and 1755 candies of Karunganni lint. Arrivals during the month were 16,887 candies (Cambodia 15,038 candies and Karunganni 1,849 candies) as against 19,668 candies (comprising of Cambodia 16,867 candies and 2801 candies Karunganni) in the previous month These arrivals included 634 candies of lint obtained from Salem, Madurai and Tiruchirapalli. Disposals of cotton for the period under review were 17,676 candies (Cambodia 16,581 and Karunganni 1,095 candies) including 2,523 candies moved outside the notified area. A stock of 8,359 candies of Cambodia and 2,509 candies of Karunganni lint were left at the close of month.

In the kapas market at Tiruppur there was an opening stock of 30,942 pothies of Combodia and 5,908 pothies of Karunganni. Arrivals of kapas totalled to 19,755 pothies (15,220 pothies - Cambodia, 4,535 pothies Karunganni) which includes 2,529 pothies received from outside the notified area. Disposals inclusive of the stock issued to gins amounted to 20,389 pothies (15,854 cambodia, 9,535 karunganni) at the end of the month.

In Koilpatti market there was an opening stock of 2,000 pothies of cotton kapas. Fresh arrivals accounted for 13,000 pothies during the month. About 10,000 pothies of cotton kapas were sold to the local and Coimbatore mills during the month leaving a closing balance of 3,000 candies at the month end.

The three markets of Virudunagar, Rajapalayam and Sattur put together opened with a stock of 3,240 pothies of kapas (3,160 pothies Karunganni 80 pothies Cambodia). Arrivals during the month totalled 30,592 pothies (29,920 of Karunganni and 672 of Cambodia). Disposals totally amounted to 31,096 pothies (30,360 Karunganni 736 cambodia) of cotton kapas. The balance left over at the end of the month was 1,936 comprising of 1920 pothies of Karunganni and 16 Cambodia kapas.

Prices: *Cambodia* (LINT): The market for Cambodia lint opened at Rs. 882/- per candy at Tiruppur and steadily rose upto Rs. 920/- on 28—5—1955. At the Virudunagar market of Cambodia lint which stood at Rs. 680—700 per candy in the first week marked a gradual decline to close lower at Rs. 640—690.

Cambodia kapas: The prices ruled steady at Tiruppur in the region of Rs. 114/- to 116/- per pothi as against Rs. 107/- to 113/- in the previous month. At the Virudunagar market the rates which opened at Rs. 67—8—0 to 88—8—0 per pothi tended to improve and closed better at Rs. 67—8—0 to 93/- according to quality. Prices of Uganda cotton lint in Virudunagar market marked a slight decline from Rs. 1,096/- to 1,056/- between opening and closing.

Karunganni (LINT): Prices of Karunganni lint at Tiruppur opened at Rs. 690/- per candy and shot upto Rs. 725/- from closing of the third week. At the Virudunagar market prices which commenced at Rs. 680/- to 700/- per candy remained more or less unchanged during the month closing at Rs. 660/- to 700/-. The market for Karunganni at Koilpatti rules at Rs. 676/- per candy for the first quality and Rs. 696/- for the best seed farm lint at the beginning of the month. There was however a gradual improvement to Rs. 716/- during the third week but declining again to close finally at Rs. 700/- which however is a better level than in the previous month.

Karunganni kapas: Prices of Karunganni kapas at Tiruppur market maintained a steady tone at Rs. 80/- to 82/- per pothi during the month. The kapas market for Karunganni at Virudunagar ruled steady at Rs. 76/- to 81/- throughout. Kapas market at Koilpatti opened at Rs. 84/- per pothi for first quality and slided down to Rs. 80/-. Seed farm kapas however maintained a firm level at Rs. 90/- throughout the month.

Cotton Seeds: The opening rates for cotton seeds at Koilpatti market stood at Rs. 20/- per pothi of 252 lb. for the best quality dropped down to Rs. 18/- after a week. The rates for Karunganni seed at Virudunagar market which opened at Rs. 15/- to 18—8—0 per pothi of 252 lb. declined gradually and closed at Rs. 12/- to 15—8—0 towards

closing of the month. Cambodia cotton seed also declined in prices opening at Rs. 14/- per pothi and closing at Rs. 10—8—0 per pothi of 252 lb.

II. **Groundnut**: (Candy in this section means 531 lb. Kernels and bag is 80 lb. pods.) Arrivals of Groundnut kernels in the eight Regulated markets of South Arcot went down during the month accounting for 1,225 tons of kernels as against 1,551 tons received during last month. North Arcot District accounted for 370 tons of receipts of groundnut kernels, of which 350 tons were received by the Tiruvannamalai market and the remaining by Vellore market.

The average prices for kernels for the whole month as between the different markets of South Arcot were in the region of Rs. 88—8—0 per candy in the Villuppuram market in North Arcot District remained featureless and the hopes of the producers for a rise during the month did not materialise. The prices ranged from Rs. 88/- to 93/- and Rs. 85—8—0 to 88/- respectively at the Tiruvannamalai and Vellore markets at opening period. The closing rates were a little better and stood at Rs. 89/- to 95/- at Tiruvannamalai and Rs. 85/- to 90/- at Vellore The rates for groundnut pods at Tiruvannamalai remained more or less steady at Rs. 9/- to 9—8—0 per bag of 80 lb. The groundnut kernel rates at Virudunagar market opened steady at Rs. 96/- to 100/- per candy and reached Rs. 93/- to 101/- towards closing period of the month.

III. **Gingelly**: (Bag in this Section—2 Maunds each of 82 2/7 lb.) The arrivals of gingelly in the five regulated markets of South Arcot were declining during the month. A total quantity of 381 bags of gingelly was received in all the five markets as against 1338 bags in the previous month Prices of Gingelly seeds ruled at Rs. 18/- to 19/- per maund in all the markets except at Vriddachalam where it remained steady around Rs. 18—8—0 per maund.

IV. **Coconut**: The four markets in Malabar (Kozhikode, Badagara, Ponnani and Tellicherry) had on opening stock of 4·8 million nuts and 7 million nuts were further received during the month. Out of these 7·5 million nuts were cleared as disposals in the markets leaving a closing balance of 4·4 million nuts. Out of the total disposals of 7·5 million nuts, 7·1 million were despatched to other districts and States. Though the arrivals were heavy there was no shipment during the month.

Opening prices in all the markets of Malabar stood at Rs. 110/- to 135/- per thousand (husked) nuts but slightly went down to Rs. 95/- to 134/- towards the month end. The arrivals in Mangalore were fair and kept pace with disposals. The Mangalore market for coconuts ranged between Rs. 135/- to 160/- per 1,000 (husked) raw nuts and Rs. 160/- to 200/- per 1,000 dry nuts.

Copra: (Candy in this Section—700 lb.) The copra markets of Kozhikode and Badagara held an opening stock of 3,134 candies of copra. A quantity of 5,195 candies were received in both the markets in the month while the disposals accounted for 5,194 candies of which 3,640 candies were despatches sent to places outside the district. A closing stock of 3,135 candies remained in these two markets at the closing of the month.

The prices of copra registered some improvement during the month. The fluctuations as between the different varieties and markets were as noted below:

	(In Rupees per candy of 700 lb.)			
Varieties	*Kozhikode*		*Badagara*	
	Maximum	Minimum	Maximum	Minimum
Office	300	282	235	280
Edible	335	295	305	290
Madras	385	285	385	365
Rajpur	430	425	437	430

At Mangalore the transactions were limited and the prices ranged from Rs. 281/- to 307—9—0 per candy of 700 lb.

V. **Arecanut:** The Supari stocks at Mangalore opened at 10,351 Cwt. and 11,000 Cwt. were added to this by the receipts during the month. Disposals and exports accounted for 18,409 Cwt. leaving a closing balance of 2,942 Cwt. at the end of the month. The prices of Supari were steady during the first half of the month and declined thereafter. The ranges of prices of different varieties in Mangalore market are indicated below:—

	(Price per candy of 700 lb. in Rupees)	
	Maximum	Minimum
Mangalore Supari	175	153/12
Malabar Supari	132/9	150/2
Koka	95/8	127/5

The stock of arecanut (chur) in Kozhikode, Ponnani and Palghat markets at the commencement of the month was 945 bags (each bag 100 lb.) while 442 bags were received during the month. Disposals both by way of local sales as well as despatches amounted to 416 bags leaving 853 bags at close of the month. The prices of arecanut at Palghat ruled at Rs. 175/- to 192/- per bag and remained more or less steady through out the month.

VI. **Tobacco:** (Candy in this Section is 500 lb.) A total opening stock of 11,210 candies of chewing tobacco and 3,848 candies of cheroot tobacco was handled in the markets of Coimbatore District. Out of these 2,920 candies of chewing variety and 1,290 candies of cheroot tobacco were despatched to places outside the district chiefly, Dindigul, Palghat,

Thiruvarur, Vedaranyam, Pudukottai and parts of Travancore-Cochin State. Tobacco market ruled firm with a slight improvement in prices. The range or prices was as indicated below :—

Variety	Grade I Rs.	Grade II Rs.	Grade III Rs.
	(Price per Candy)		
1. *Chewing tobacco* (Sun cured):			
(a) Meenampalayam ...	460—510	350—440	200—300
(b) Other varieties ...	425—450	275—340	200—250
2. *Cheroot varieties* (Sun cured):			
(Erode and Bhavani Crops)...	200—240	140—180	100—120

Activities of the Market Committees During the Month of May, 1955

Of the seven Market Committees in the State, five in the districts of North Arcot, South Arcot, Coimbatore, Malabar and South Kanara were actively functioning. The activities of the Committees in the districts of Ramanathapuram and Tirunelvely continued to be restrained because of the injunction order of the Madras High Court.

The following progress was made by the Market Committees during the month in the issue of licences under the Madras Commercial Crops Markets Act.

Committees	Licences to Persons for places under Section 5(1)		Section 5(3)		Licences to Weighmen		Brokers	
	A	B	A	B	A	B	A	B
North Arcot Market Committee ...	76	694	30	327	20	270	—	10
South Arcot Market Committee ...	72	1077	77	1247	15	458	2	5
Tirunelveli Market Committee ...	—	36	—	15	—	17	—	—
Coimbatore Market Committee ...	23	43	26	68	—	—	—	—
Malabar Market Committee ...	9	268	28	890	4	104	—	5
South Kanara Market Committee —	16	195	12	163	4	37	—	38

(A: During the Month. B: Progressive total for the year)

The total of transactions in commercial crops in the thirteen regulated markets in the State during May 1955 is extracted below:—

Crop	Quantity	No. of Regulated Markets
Groundnut kernels ...	1,225 tons	10
Gingelly ...	381 bags (2 Mds. each)	5
Cotton Lint ...	4,644 Candies (784 lbs. each)	3
Cotton kapas ...	10,261 pothies (280 lb. each)	3

Meetings: A meeting of the South Arcot Market Committee was held on 13—5—'55 and 34 subjects were discussed. A meeting of Malabar Market Committee was conducted on 31—5—'55 when three subjects were tackled for discussion. The other committees are functioning under the respective District Collectors under Section 6-A. of the Madras Commercial Crops Markets Act.

Special features: The Joint Secretary to Food and Agriculture Department, Government of India and the Registrar of Co-operative Societies, Madras paid a visit to the Regulated Markets of South Arcot Market Committee at Tindivanam and Cuddalore on 27th and 28th respectively. Remarks made by these visitors are extracted below:—

Remarks made by the Joint Secretary, Ministry of Food and Agriculture, Government of India, New Delhi, at Tindivanam Regulated Market on 27—5—'55.

"I visited this Institution this morning and was very much impressed with the progress that it has been steadily making during the last several years. I am afraid however that I have not seen similar institution elsewhere and this is my first acquaintance with operations of an institution of this nature. Such bodies could do a lot in the country and I think I could point to other State Governments what is being done is Madras State in this sphere."

Remarks made by Registrar of Co-operative Societies, Madras on 28—5—'55 at Cuddalore Regulated Market.

"I and Sri R. S. Krishnaswami, Joint Secretary, Food and Agriculture Department, Government of India were shown round the working of the Regulated Market Scheme in respect of Groundnuts. The buyers and sellers stand to gain with the arrangements in vogue and it is gratifying to be told that more than 90% of the arrivals at Cuddalore are handled at the Committee".

The Director of Co-operation, New Delhi visited Malabar and South Kanara Districts during the month and conducted enquiries with special reference to the facilities to be afforded to the growers under

financing storage and Marketing. In G. O. Ms. 1351, Agriculture Department dated 17—5—'55 the Government have issued directions that in making badges for wieghmen all the Market Committees should adopt strict uniformity in the design and description of the badges as laid down in the G. O. The Committees are also advised to give wide publicity about the adoption of the badges prior to their being used by weighmen.

Quality appraisal: The South Arcot Market Committee continued its work on the quality of groundnut kernels marketed in five of its Regulated markets on the basis of random sampling. A total of 630 samples of groundnut kernels were drawn from arrivals into five regulated markets from 3,643 lots comprising 1,225 tons.

A quality competition in Groundnut brought up for sale in the regulated markets of South Arcot in respect of the summer crop was inaugurated. But there were no entries during the month as the pace of arrivals had not picked up momentum.

Groundnut Oil Industry — Cost of Production of Groundnut Oil

by

K. V. NATESAN, B. Sc. (Ag.),
Secretary, South Arcot Market Committee, Cuddalore

Production of groundnuts in South Arcot District is estimated at one lakh of tons of kernels. Of this quantity 20% or 20,000 tons is the estimated quantity reserved for seed and edible purposes. Out of the balance of 80,000 tons 5,000 tons are estimated as consumed by local country chekku owners and 50,000 tons by power crushers like Rotaries and Expellers. The balance quantity is despatched outside the district for the oil crushing industry. This district was exporting nearly 80% of its marketable surplus to foreign countries before the commencement of the world War II in 1939. After the close of the War and with the stoppage of Export of Groundnut kernels to foreign countries, local capitalists and industrialists have set up a number of oil crushing units in various assembling centers of this district. Now there are 67 Expellers, 46 Rotaries and 1500 country chekkus working in the Diistrict. The Mill Owners and Chekku Owners are the chief buyers of the groundnut kernels arriving in the Regulated Markets of South Arcot. The Mill Owners buy the groundnuts based on the price of oil at Madras Port.

The crushing of groundnuts in the District is carried out by

(a) Country wooden or Stone Chekkus (Village Ghanis)

(b) Power Driven Rotaries, and

(c) Expellers.

Chekkus (Village Ghanis): There are 1500 country chekkus working in the district. They are worked individually by their owners, who crush the groundnuts either purchased by them or for hire, in which case a charge is levied for crushing either in the form of cash or as cake. If it is the latter, the entire quantity of cake is retained as crushing charges. They are able to crush about 25 to 30 lb. of kernels per charge and about a bag of 177 lb. of kernels per day of eight hours working. The oil from the chekku is not filtered. Some persons prefer chekku oil to the expeller oil for consuption. The chekku oil cake is preferred to the expeller cake as cattle food as the former contains a higher percentage of oil.

Cost of Production of Oil:

1.	Establishment charges for a day of 8 hours for the feeder and driver	Rs.	1—8—0
2.	Cost of bag of kernels at Rs. 34/- per bag of 177 lb.	,,	34—0 -0
3.	Depreciation on the chekku, animals, pots and other accessaries	,,	1—8—0
4.	Other contingencies	,,	1—0—0
		Rs.	38—0—0

At 40% extraction of oil through country chekku, the quantity of oil that will be produced will be 70 lb. of oil 105 lb. cake and 2 lb. being wastage.

Cost of cake at Rs. 14/- per bag of 160 lbs. (loose)	Rs.	8-12—0
Therefore cost of production of 70 lbs. of oil		
Rs. 38—0—0 minus Rs. 8—12—0	,,	29—4—0
or Cost of one candy of oil	,,	209—0—0

Rotaries: There are 46 Rotaries in the District. These are more or less of the type of chekku but made of iron and worked by power. Each Rotary is able to take in 25 to 30 lb. of kernels per charge. A rotary mill can crush about 900 lb. of kernels (or 5 bags) per day of 8 hours working. As in the case of country chekkus, the whole kernels are fed to the mortar and water is added now and then for clarification during the process of crushing. The oil which flows through a hole provided in the bottom of the mill is either collected directly or allowed to flow into a "Settling Tank". There are factories which have five to eight rotaries in them.

Cost of production of oil: Assuming that there are four rotaries in a factory it will handle 20 bags of groundnut kernels (each bag 177 lb. nett) in a day of 8 hours working and produce 1400 lb. of oil and 2100 lbs. of cake taking the out-turn at 40% of oil and 58% cake and allowing for a wastage of 2%.

Daily Expenses:

1.	Cost of 20 bags of kernels at Rs. 34/- per bag	Rs.	680—0—0
2.	Over head charges on establishment taxes, rent, postage and telegram, sales tax and electric energy	,,	13—0—0
3.	Wages for drying packing, stitching of bags etc., and transport	,,	5—0—0
4.	Lubricants and sundries	,,	1—0—0
5.	Travelling Expenses of staff	,,	2—0—0
6.	Maintenance of buildings and repairs and upkeep	,,	2—0—0
7.	Depreciation on buildings at 5% per annum	,,	3—0—0
8.	Depreciation on machinery at 10% per annum	,,	3—0—0
9.	Depreciation of furniture and electric installation	,,	0—8—0
10.	Depreciation on barrels and gunnies	,,	4—8—0
11.	Cost of spare parts, Insurance charges etc.	,,	7—8—0
12.	Fees on groundnuts	,,	2—0—0
13.	Lorry Charges to Madras or to local market centre	,,	2—8—0
	Total	Rs.	726—0—0

Cost of 2100 lbs. of cake (at Rs. 12/- per bag of 160 lb.)	Rs.	157—0—0
Therefore cost of production of 1,400 lb. oil Rs. 726/- minus Rs. 157-8-0 i. e. Rs. 568-8-0		
Therefore cost of one candy of oil	,,	203—0—0

Expellers: This is the most important type of machinery used for crushing groundnuts. After 1946, many expellers have been set up. Such factories have been established not only in the assembling centres of the district but also in important consuming centres outside namely, Madras, Tiruchirapalli, Madurai, Virudhunagar etc., In each such factory there are from two to four expellers, but some factories like those of Messrs. Louis Dreyfus & Co., Ltd., at Tindivanam and Messrs. Rallis India Ltd., at Cuddalore have gaint expellers with higher capacity for crushing. Though the type of expellers differ, the principle of working of these expellers is the same in all. An expeller is able to crush as much as 60 to 75 bags of groundnuts per day of 24 hours of three shifts of 8 hours duration for each shift. Maximum quantity of oil extraction is obtained when groundnuts are crushed through expellers.

The yield of oil and cake obtained by crushing of groundnuts varies with the quality of kernels, variety used, rainfed or irrigated, soil and climatic conditions. Figures collected from different oil mills in South Arcot district show that the yield of oil varies from 41% to 45% according to different types of kernels, the summer irrigated kernels of Virudhachalam Market producing the maximum out-turn of oil. Allowing two percentage wastage, the balance 57% to 53% is the quantity of cake that can be expected.

Cast of Production of Groundnut Oil by Expellers: Assuming that there are four expellers in a factory it will easily handle 230 bags of groundnut kernels (each bag 177 lb. of kernels nett) in a day and produce 35 candies of oil (one candy 500 lb. nett) and 147 bags of groundnut cake (a bag of cake 160 lb. nett), taking the out-turn of oil at 43% and the cake at 55% and allowing for the wastage of 2%.

The following are the expenses of a monthly nature the number of working days in a month being taken as 24 on an average.

1.	Establishment charges on a monthly basis	Rs.	900—0—0
2.	Tax, licence fees, Panchayat or Municipal fees etc ,	,,	200—0—0
3.	Tapals, Telegrams and Postage	,,	100—0—0
4.	Sales tax on purchase of kernels	,,	3,000—0—0
5.	Electric charges for lighting and power	,,	750—0—0
		Rs.	4,950—0—0
	or Expenses per day	,,	206—4—0

Daily Expenses:

1.	Cost of 230 bags of groundnuts at Rs. 34/- per bag	Rs.	7,820—0—0
2.	Over head charges as above	,,	206—4—0
3.	Wages for drying, packing, stitching of groudnut bags-casual labour before transport to factory	,,	45—0—0
4.	Fuel for boiler	,,	40—0—0
5.	Lubricants and Sundries	,,	5—0—0
6.	Travelling expenses of Staff	,,	10—0—0
7.	Audit Expenses	,,	1—0—0
8.	Printing and Stationery	,,	2—0—0
9.	Maintenance of buildings repairs and white washing	,,	5—0—0
10.	Depreciation on buildings at 5% per annum	,,	12—8—0
11.	do. on machinery at 10%	,,	15—0—0
12.	do. on furniture, electric instalation at 6%	,,	1—0—0
13.	Depreciation on barrels and gunnies	,,	15—4—0
14.	Cost of spare parts, insurance, income-tax, bank interest etc.,	,,	80—0—0
15.	Fees on groundnut, carting charges from market to factory	,,	60—0—0
16.	Lorry Charges on 35 candies of oil to Madras	,,	150—0—0
		Total Rs.	8,468—0—0

Receipts:

35 candies of oil at Rs. 200/- per candy		Rs.	7,000—0—0
147 bags of cake at Rs. 12 per bag		,,	1,764—0—0
		Rs.	8,764—0—0
Net profit per day	Rs. 8,764—0—0 minus		
	,, 8,468—0—0	,,	296—0—0
Cost of production of a candy of oil	Rs. 8,764—0—0 minus cost of cake		
	,, 1,764—0—0		
	,, 6,704—0—0 divided by 35		
i. e.	,, 181—7—0 per candy		

The cost of production of oil at the different mills varies according to the price of groundnuts and other incidental charges. The cost is worked out at current prices of kernels and oil in March 1955.

Crop and Trade Reports

Crop—Green-gram—1954—'55—First and Final Forecast Report: The area sown with greengram in Madras State upto 25th December 1954 is estimated at 1,28,000 acres. Compared with the estimated area of 1,27,100 acres for the corresponding period of the previous year, this is an increase of 0·7 per cent. Compared with the average area of 1,24,600 acres calculated for the previous five years ending with 1952—'53 this is an increase of 2·7 per cent. The crop is mainly grown in the districts of Coimbatore, Tanjore and Tirunelveli. An increase in area is estimated in the districts of Chingleput, North Arcot, Tanjore, Ramanathapuram, Tirunelveli and South Kanara and a decrease in other districts of the State except Tiruchirapalli and Madurai where the area estimated was the same as that of last year. The area under the crop was nil or negligible in the Nilgiris district. The crop has been harvested in some districts of the State. The yield per acre is expected to be slightly below normal in all the districts of the State. The seasonal factor for the State as a whole works out to 97 per cent of the normal as against 96 per cent of the normal for the previous year. On this basis, the total yield works out to 10,300 tons of cleaned grain. Compared with the yield of 10,000 tons of cleaned grain estimated for the previous year, the present estimate is an increase of 2·0 per cent. Compared with the average yield of 8,300 tons of the cleaned grain calculated for the five years ending with 1952—'53 this is an increase of 24·1 per cent. The average wholesale price of greengram (Dhall) per maund of 82 2/7 lb. on 8th January 1955 was Rs. 16—0—0 in Salem. Compared with the price which prevailed on 9th January 1954, this shows a decrease of 22·0 per cent.

Blackgram—1954—'55—Madras State—First and Final forecast Report: The area shown with blackgram in the Madras State upto 25th December 1954 is estimated at 1,28,500 acres. Compared with the estimated area of 1,41,000 acres

for the corresponding period of the previous year and the average area of 1,43,900 acres calculated for the previous five years ending with 1952—'53, the present estimate is a decrease of 8·9 percent and 10·7 percent respectively. The crop is mainly grown in the districts of Tanjore, Madurai, Tirunelveli, Malabar and South Kánara. A decrease in area is estimated in the districts of Chingleput, Coimbatore, Tiruchirapalli, Tanjore, Tirunelveli and South Kanara and increase in area in Ramanathapuram district and the area estimated for other districts is the same as that of last year. The area under the crop in the Nilgiris district is little or negligible. The crop has been harvested in some portions of the districts of the State. The yield per acre is expected to be normal in the districts of Tiruchirapalli and Tanjore and slightly below the normal in the other districts of the State. The seasonal factor for the State as a whole works out to 97 per cent of the normal as against 96 per cent estimated for the previous year. On this basis the total yield works out to 13,500 tons of cleaned gram. Compared with the yield of 14,500 tons of cleaned gram estimated for the previous year the present estimate shows a decrease of 6·9 per cent. It shows an increase of 9·8 per cent when compared with the average yield of 12,300 tons of cleaned gram calculated for the five years ending 1952—'53. The average wholesale price of blackgram (dhall) per maund of 82 2/7 lbs. (3,200 tolas) as reported from some of the important centres on 8—1—1955 was Rs. 15—8—0 at Salem Rs. 20—8—0 at Tanjore and Rs. 23—7—0 at Tirunelveli. Compared with the prices that prevailed during the corresponding period of last year the present prices reveal a fall of 22·2 per cent at Tirunelveli, 22·7 per cent at Salem and 24·1 per cent at Tanjore.

Horsegram—1954—'55—Madras State—First and Final Forecast Report: The area sown with horsegram in the Madras State upto 25th December 1954 is estimated at 5,64,800 acres. Compared with the area of 5,53,200 acres estimated for the corresponding period of last year and the average area of 5,40,800 acres calculated for the previous five years ending with 1952—'53, the present estimate reveals an increase of 2·1per cent and 4·4 per cent respectively. A decrease in area is estimated in the districts of Salem, Tanjore and South Kanara and an increase in area in all the other districts of the State except Chingleput and Tiruchirapalli where the area was the same as that of last year. The area under the crop in the Nilgiris district was little or negligible. The yield per acre is estimated to be normal in the districts of the Tiruchirapalli and Tanjore and slightly below the normal in the other districts of the State. The seasonal factor for the State as a whole works out to 97 per cent of the normal as against 98 per cent of the normal estimated for the previous year. On this basis, the yield works out to 48,900 tons. Compared with the estimated yield of 48,700 tons for the corresponding period of last year and the average yield 34,400 tons calculated for the previous five years ending with 1952—'53, the present estimate shows an increase of 0·4 per cent and 42·2 per cent respectively.

Ragi—Second Report—1954—'55—Madras State: The area sown with ragi upto the end of December, 1954 is estimated at 790,500 acres. Compared with the area of 777,800 acres estimated for the corresponding period of the previous year, this is an increase of 1·6 per cent. As compared with an average area of 727,300 acres calculated for the five years ended 1953—'54, the present estimate shows an increase of 8·7 per cent. The crop has been or was being harvested in the districts of Chingleput, South Arcot, North Arcot, Salem, Coimbatore, Madurai, Malabar, South Kanara and the Nilgiris, at the time of the report. The yield per acre is expected to be slightly below normal in all the districts of the State. The seasonal factor for the State as a whole works out to 95 per cent of the normal as against 98 per cent estimated for the corresponding period of the previous year. On this basis, the total yield works out to 362,500 tons of unhusked grain or 326,200 tons of

cleaned grain as against 363,100 tons of unhusked grain or 331,300 tons of cleaned grain estimated for the corresponding period of the previous year, representing a decrease of 1·5 per cent. As compared with the average production of 273,900 tons of unhusked grain or 246,500 tons of cleaned grain calculated for the five years ended 1953—'54, the present estimate shows an increase of 32·3 per cent. The wholesale price of ragi per standard maund of 82 2/7 lb. as reported from some important market centres for the fort-night ending 31st December, 1954 was Rs. 8—0—0 at Tiruppur, Rs. 9—0—0 at Kanchepuram and Salem and Rs. 10—12—0 at Vellore.

Crop—Cholam—(Jowar)—1954—'55—Third and Final Forecast Report—Madras State: The area sown with cholam (Jowar) in Madras State in 1954—'55 is estimated at 1,953,000 acres. Compared with the final estimate of 1,994,600 acres for the previous year, the present estimate is a decrease of 2·1 per cent. It shows an increase of 11·3 per cent over the average area for the five years ended 1953—'54 viz. 1,754,400 acres. Cholam is not grown in the district of South Kanara and is an insignificant crop in Malabar, Tanjore and the Nilgiris districts. Compared with the final area of 1953—'54, the present estimate reveals an increase in the districts of Chingleput, South Arcot, Tiruchirapalli, Tanjore, Ramanathapnram, Tirunelveli, Malabar and the Nilgiris and a decrease in the other districts of the State. The main crop has been harvested in most districts of the State. The seasonal factor for the State as a whole works out to 98 per cent Kharif Crop and 95 per cent of Rabi Crop, as against 96 per cent and 94 per cent respectively for the previous year. The total yield for the State works out to 637.800 tons of unhusked grain or 542,100 tons of cleaned grain. This shows a decrease of 0·1 per cent when compared with the yield of 638,500 tons of unhusked grain or 542,700 tons in terms of cleaned grain estimated for the previous year and an increase of 38·9 per cent as compared with the average yield of 459,300 tons of unhusked grain or 390,500 tons of cleaned grain estimated for the five years ended 1953—'54.

Tobacco—Second Report—1954—'55—Madras State: The area under tobacco sown up to the end of February 1955 is estimated at 45,900 acres. Compared with the area of 47,700 acres estimated for the corresponding period of last year, it is a decrease of 5·2 per cent. Compared with an average area of 43,300 acres calculated for the previous five years ending with 1953—'54, this is an increase of 4·4 per cent. An increase in area is estimated in the districts of North Arcot, Madurai, Ramanathepuram and South Kanara and a decrease in area in the other districts of the State except Chingleput, Malabar and the Nilgiris where the area under tobacco is little or negligible and Tiruchirapalli district where the area is expected to be the same as that of last year. The crop is reported to have been attacked by aphids in Coimbatore district. The yield per acre is expected to be normal in the district of South Kanara and slightly below normal in the districts of the State. The seasonal factor for the State as a whole works out to 92 per cent of the normal as against 98 per cent of the normal estimated for the corresponding period of last year. On this basis, the total yield works out to 25,100 tons of cured leaf as against 28,100 tons of cured leaf for the corresponding period of last year representing a decrease of 10·7 per cent. Compared with an average yield of 20,200 tons calculated for the previous five yaars ending with 1953—'54. This is an increase of 23·6 per cent. The wholesale price of tobacco per standard maund of 82 2/7 lb. or 3,200 tolas as reported from important market centres on 12—3—1955, was Rt. 49—14—0 in Tiruppur and Rs. 41—0—0 in Erode. Compared with the prices which prevailed on 13—3—1954, the price at Tiruppur reveals an increase of 5·1 per cent, the price in Erode remaining stationary.

Maize—Madras State—1954-'55—First and final forecast report: The area sown with Maize in the Madras State in 1954—'55 is estimated at

15,900 acres. Compared with the corresponding area of 14,400 acres estimated in the previous year, there is an increase of 10·4 per cent. The estimated area in the current year is higher than the average area during the five years ended 1952—'53 viz., 12,200 acres by 30·3 per cent. The area under the crop is little or negligible in the districts of Ramanathapuram, Tirunelveli, South Kanara and the Nilgiris. A decrease in area is estimated for Tanjore district while the area estimated for Coimbatore and Malabar districts is the same as in the previous year. The area estimated for the other districts show an increase. The crop has been or is being harvested. The yield per acre is estimated to be normal in the districts of the State.

The seasonal factor for the State as a whole works out to 99 per cent as against 98 percent estimated for the corresponding report of the previous year. On this basis, the total yield works out to 6,900 tons of unhusked grain or 4,200 tons in terms of cleaned grain as against 6,300 tons of unhusked grain or 3,800 tons of cleaned grain estimated for the correspnding report of the previous year, representing an increase of 9·5 per cent.

Ragi—Third or final forecast for the year 1954-'55—Madras State: The area sown with ragi in the Madras State in 1954—'55 is estimated at 1,004,500 acres. Compared with the provisional figures of area of 1,031,000 acres for the previous year according to the Season and Crop Report the current year's estimate is a decrease of 2·6 per cent. Compared with the average area of 908,800 acres calculated for the five years ended 1953—'54 the present estimate is an increase by 95,7000 acres or 10·5 per cent. Compared with the provisional figures of area for the previous year the present estimate reveals an increase in area in the districts of Chingleput, South Arcot, Coimbatore, Tirunelveli, Malabar, South Kanara and the Nilgiris and a decrease in area in the remaining districts of the State. The main crop has been harvested. The yield per acre is estimated to be normal in the other districts of Salem, Coimbatore, Tanjore, Tirunelveli and the Nilgiris and slightly below normal in the other districts of the State.

The seasonal factor for the State as a whole works out to 97 per cent of the normal as against 96 per cent for the previous year. The total yield works out to 469,500 tons of unhusked grain or or 422,500 tons of cleaned grain. Compared with the provisional estimate of 473,800 tons of unhusked grain or 426,400 tons of cleaned grain according to the Season and Crop Report for the previous year, the current year's estimate represents a decreased of 0·9 per cent. The present estimate reveals an increase of 35·3 per cent as compared with the average of 347,100 tons of unhusked grain or 12,400 tons of cleaned grain calculated for the five years ended 1953—'54. The wholesale price of ragi per standard maund of 82 2/7 lb. (3,200 tolas) as reported from some market centres for the week ending 12—3—1955 was Rs. 10/-at Vellore, Rs. 8—2—0 at Salem and Rs. 7—10—0 at Tiruppur. Compared with the prices which prevailed during the corresponding period of the previous year, the current prices reveal a fall of 23·3 per cent at Tiruppur, 19·3 per cent at Salem and 18·4 per cent at Vellore.

Onions—Second and final forecast Report—1954—'55—Madras State: The area under onions in the Madras State during 1954—'55 is estimated at 26,600 acres. Compared with the final area of 24,400 acres and an average area of 22,200 acres calculated for the five years ending with 1953—'54 the present estimate is an increase of 9·0 per cent and 19·8 per cent respectively. The area estimated is the same as that of last year in the districts of Chingleput, Tanjore and the Nilgiris, a decrease in Madurai district and an increase in the other districts of the State except Malabar and South Kanara districts where the area under the crop is little or negligible. The main crop has been harvested. The seasonal factor for the

State as a whole works out to 96 per cent of the [norma as against 93 per cent of the normal estimated for the previous year. On this basis, the total yield works out to 126,600 tons as against 116,300 tons estimated for the previous year and an average yield of 92,200 tons calculated for the previous five years ending with 1953—'54 representing an increase of 8·9 per cent and 37·3 per cent respectively. The average wholesale price of onions per maund of 82 2/7 lb. or 3,200 tolas as reported from imporant market centres on 14—5—1955 was Rs. 5—0—0 in Coimbatore and Mangalore Rs. 4—13—0 in Kancheepuram, Rs. 4—0—0 in Vellore and Nagapattinam. Compared with the prices which prevailed in the corresponding period of the previous yerr, these prices reveal an increase of 14·3 per cent in Mangalore and a decrease 16·3 per cent in Kancheepuram and 15·8 per cent in Nagapattinam the prices remaining stationary in Coimbatore and Vellore.

Gingelly—Fourth and final forecast report—1954—'55—Madras State: The area sown with gingelly (sesamum) in Madras State in 1954—'55 is estimated at 4,58,500 acres. Compared with the final area of 4,52,700 acres for 1953—'54, the present estimate shows an increase of 1·3 per cent. The present estimate reveals an increase of 20·4 per cent over the average area of 3,80,800 acres calculated for the five years ending 1953—'54. An increase in area is estimated in the districts of Chingleput, North Arcot, Coimbatore, Tanjore, Tirunelveli and Malabar and a decrease in other districts of the State. The crop has been or is being harvested in most of the districts of the State. The yield per acre is expected to be normal in the districts of Tanjore and Tirunelveli and slightly below normal in the remaining districts. The seasonal factor for the State as a whole works out to 97 per cent of the normal as against 93 per cent of the normal as against 93 per cent of the normal as against 93 per cent for the previous year. On this basis, the total yield works out to 57,700 tons as against 55,100 tons estimated for the previous year; representing an increase of 4·7 per cent. Compared with the average yield out to 57,700 tons as against 55,100 tons estimated for the previous year; representing an increase of 4·7 per cent. Compared with the average yield of 41,800 tons calculated for the five years ended 1953—'54 the present estimate is an increase of 38·0 per cent. The wholesale prices of gingelly seed per standard maund of 82 2/7 lb. or 3,200 tolas, as reported from important market centres on 9th April 1955 was Rs. 21—12—0 at Tuticorin, Rs. 20—6—0 at Tiruchirapalli, Rs. 20—1—0 at Salem and Cuddalore and Rs. 20/- at Tirunelveli. Compared with the prices which prevailed on 10th April 1954 these prices show a decrease of 35·4 per cent at Salem, 33·4 per cent at Tirunelveli, 31·0 per cent at Cuddalore.

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Editorial

Newer frontiers in Agricultural Sciences: The next symposium for the ensuing College Day and Conference to be held in August of this year at Coimbatore is on the intriguing subject of "What next in Agriculture". We have had many enquiries as to what exactly is expected under the caption. To our knowledge the major part of the symposium should be devoted to the "big ideas", that the big and the small in Agriculture, would have to put forth on the various branches of Agricultural science. In this connection, we would like to draw the kind attention of our readers to our Editorial in the March issue of this Journal on "What is your big idea?". The ensuing symposium offers to one and all the great opportunity to put forth their "big ideas", for the future development of the Agriculture of our State. The main object is to give a new look to Agriculture and to reach newer frontiers in the different fascinating facets of this science.

Great changes and adjustments have taken place in Agriculture and its science in the recent past and newer horizons have been reached with the enlargement in its varied branches. Mechanisation, for example, is one of the main advances which arrests our attention first and foremost. Tractors and other Agricultural machinery have come into use more and more. Contraptions and modifications to suit the conditions in every tract have also come into vogue. Even in wet areas where the tractor could not ordinarily get in, gadgets like the "hydraulic muledozer" have been introduced to enable the easy cultivation of rice and sugarcane fields. So the farmers of the future have to increase their production through intensive cultivation of the areas already available

in order to keep up with the increased investments they would have to make on their tractors and farm machinery. It is here that the other Agricultural sciences step in to help them.

The Biologists working on plants give them better seed material through evolved strains. They also give the farmers varieties of plants which withstand drought, disease and other similar adverse conditions. In the days past the farmers were helpless against these and had few weapons to combat pests and diseases. Now, they can not only have such genetically fortified seeds, but also have enough pesticides to wrangle with all the common maladies of the plant.

Above all, the newest horizon in the frontiers of Agriculture is the one opened out through Agricultural chemicals. Chemicals for a variety of purposes as fertilisers, hormones, pesticides and herbicides have come into use. 2, 4. dichloro-phenoxy-acetic acid more generally known as "2, 4-D" is a weed killer in one concentration while it is a hormone, auxin or growth regulator at another lower concentration. There are many such phenoxy compounds now in use. These compounds can intensify the colour of the fruit, can make petals stay longer, increase the water retaining power of the plant, make fruit ripen earlier and can totally prevent the formation of fruit on ornamental trees. It is explained that these compounds can not only accelerate the respiration of plants but also increase the activity of the plant enzymes and cause the accumulation of simple forms of carbohydrates. Another recent entrant in the Agricultural field is the Antibiotics like aureomycin, terramycin and others, which have proved as growth promoters at low doses in animals and plants. Though their use in animal and human diseases are well known the the newest finding is the discovery that these antibiotics can combat plant diseases as well.

All these advances have given a technical revolution in our farming practices and we have to accept the challenge of changing Agriculture and bring forth a newer outlook in all branches of the science in our State.

Studies on a Few Proprietary Preparations of Benzene Hexachloride (BHC)

by

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Benzene hexachloride (BHC) — ($C_6H_6Cl_6$ – hexachlorocyclohexane) was discovered by 1941 in France to have high insecticidal properties. This formulation is built up of mainly five isomers, of which the 'Gammaisomer' (constituting about 10–12%) possesses outstanding lethal properties against insects (Slade 1945).

BHC was available in commercial quantities in India by about 1947 and has shown much promise in the control of a number of major pests. The demand for this insecticide in plant protection has increased considerably during recent years. It may be interesting to note that the quantity distributed by the department alone during 1953–54 in the residuary State of Madras worked to about 900 tons, not to speak of the purchases made by the farmers from outside agencies. A number of firms are at present importing this chemical from abroad and are putting the same on the market under various trade names, without any authorised tests being conducted regarding the claims made for their products. The Planning Commission in their report on the First five Year Plan have rightly pointed out the need for organised guidance regarding the use of pesticides by competent agencies of the Government after due investigations in this regard.

In this note, the date gathered on the analysis of nine samples representing three proprietary brands of BHC as well as a gist of the results obtained in biological tests are furnished.

(i) **Analytical Tests:** Random samples of the different formulations were taken from consignments received from time to time at this institute for research purposes. These were got analysed for percentage of technical BHC contents and also gamma isomer contents, wherever possible, by the kind courtesy of the Plant Pathologist at the laboratory of the Plant Quarantine and Fumigation Station (Government of India), Bombay. The results are furnished as an Appendix.

(ii) **Biological Tests:** The insecticidal efficacy of the three brands specified above was also assessed simultaneously. To mention just a few instances, these investigations were conducted both under laboratory as well as field conditions against the cholam earhead bug – *Calacoris angustatus* L, chillies thrips – *Scirtothrips dorsalis* H. – the red cotton bug – *Dysdercus cingulatus* F, the tobacco thrips – *Thrips tabaci* L —, the castor semilooper – *Achoea janata* L —, the tobacco caterpillar – *Prodenia litura* F —, the ear-head blister beetle – *Lytta tenuicollis* P and the sunhemp flea beetle – *Longitarsus belgaumensis* G. The dusts were used as such while the wettable powders were tried at two concentrations, viz., one pound in 6·5 and 13 gallons of water (0·1 and 0·05% gamma BHC spray).

As a detailed account of the experiments conducted against the above pests and the data gathered, falls entirely outside the purview of the present paper only a gist of the technique followed and the results obtained are furnished below.

(a) *Laboratory Tests:* The technique adopted in these tests is that of the direct spraying with the help of an atomiser, or dusting method with the use of a piece of fine muslin. The test insects, mentioned above, were collected as and when they appeared in a pest form, in suitable containers. These were subsequently introduced into glass jars (8" x 4" size) and treated at the concentrations indicated in the above paragraph. The treated insects were made to remain in contact with the spray fluid or the dust for about five minutes, after which time they were transferred to fresh glass jars and fed with their normal food. Counts regarding the mortality of the test insects were recorded after an interval of 48 hours.

(b) *Field Tests:* The field investigations were mainly intended to check up the observations made in the course of the laboratory trials. Infested crops, were treated at the rate of about sixty gallons of the spray fluid or about 20–25 lb. of the dust per acer, whenever the above mentioned test insects occured in a pest form. The insect population was estimated before and forty eight hours after the treatment by examining random samples, of affected parts of the plants, so as to cover two per cent of the experimental area. As it would be impossible to make a record of the dead insects, under field conditions, the efficacy of the three different brands was assessed with reference to the reduction in the population of the pest, after the treatment.

The percentage of mortality in the case of the laboratory trials and the reduction in the percentage of the pest population in the course of the field trials, ranged from 92 – 100 under the three brands.

Conclusions: From the analytical data presented in the appendix and judged by the results of the biological tests conducted in this State, it is evident that there is very little difference in the comparative merits of the three proprietary products of BHC that were tested, viz., "GAMMEXANE", "HEXAMAR" and "HEXIDOL". The individual variations in the gamma isomer content of a particular concentration, amongst the three brands, are quite insignificant. The choice, therefore, lies in the price factor.

It is expected that in the interest of maintaining the reputation of the firms concerned, they would stick up to the standards presented above and would not lower the quality of the products in their eagerness to offer a lower quotation.

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APPENDIX

Results of analysis of three proprietary brands of BHC.

Name of proprietary preparation	Technical BHC. content	Gamma isomer content	Ph. of carrier
BHC (Gammexane) D025 — Imperial Chemical Industries	5·2%	0·70%	7·2
Hexamar BHC 5%—Bharat Pulverising Mills	4·8%	0·65%	7·3
Hexidol 805 — Geigy Insecticides	5·3%	0·71%	7·1
BHC (Gammexane) D120 — Imperial Chemical Industries	9·8%	1·34%	7·3
Hexamar BHC 10%—Bharat Pulverising Mills	9·6%	1·32%	7·2
Hexidol 810 — Geigy Insecticides	10·1%	1·36%	7·2
BHC (Gammexane) P520 — Imperial Chemical Industries	49·9%*	(a)	
Hexamar BHC 50% wettable powder — Bharat Pulverising Mills	49·10%*	(a)	
Hexidol 950 — Geigy Insecticides	50·52%*	(a)	

Note: (*) BHC content — (W/W basis).

(a) The gamma isomer content of the wettable powders is not determined, as on extraction of the wettable powder the technical BHC so obtained is always mixed with the other organic chemicals (like the wetting agent) used in the formulation of the powder. The wettable powders are upto specifications with regard to wettability, suspensibility and acidity as set down by World Health Organisation in their Fourth Report of the "Expert Committee on Insecticides".

Method of analysis: Two methods are followed for the estimation of the gamma isomer content. Both are polarographic methods, but differ from each other only in the method of preparation of the solution of the technical BHC for polarography. The methods are described in detail in the references (1 and 2) cited.

Causes of Poor Viability in a few Grass Seeds

by

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The seeds of South Indian grasses have in general low percentages of germination; many of these have less than 40% viability and some even less than 10% (Chandrasekharan *et al* 1950; Rajesekhara Mudaliar *et al* 1954). *Cenchrus ciliaris* and *Cenchrus setigerus* which are the notable species of grasses of the Kangayam tract and which are recommended for development and improvement of pastures, have very poor germination. To find out the causes of the poor germination capacity of important grass seeds, their dormancy periods were first studied; it was found that these grasses showed satisfactory germination only after about 12 to 15 months of dormancy. While *C. ciliaris* gave 10–20% germination after one year of storage, *C. setigerus* gave a maximum of only 8% (Rajasekhara Mudaliar *et al* 1953). To find out whether the involucre of bristles of the spikeletes in the *Cenchrus* sp. has anything to do as mechanical barrier in the germination of seeds, these investigations were carried out.

Cenchrus ciliaris, Cenchrus setigerus and Blou buffel *(Cenchrus* sp.) were taken as the material for study. Spiklets are generally considered as seed for sowing in grasses and these were collected at different seasons, viz., January 1952, January 1953, November 1954 and June 1954, and dissected to note the percentage of grain setting.

The dissected grains, both well developed and poorly developed were soaked in water for sixteen hours and then kept separately for germination in seed testing trays, with another set of whole spikelets kept as control.

1. **Grain Setting:** On dissecting the spikelets, it was found all the spikelets did not have grain setting. Further, in cases where there was grain setting, there were both fully developed and poorly developed grains. Table I shows the percentage of grain-setting in the three species of grasses taken up for study.

It is seen from the data presented in Table I that the grain-setting in the spikelets is only about 42% in *Cenchrus ciliaris;* 38% in *Cenchrus setigerus* and 35% in *Cenchrus* sp; (Blou buffel). Of these

the well-developed grains are only 24·4, 28·4 and 20 percentages respectively. There is no appreciable difference in the setting of grains in the different species and for each species in different seasons.

2. **Germination Trials:** In the germination tests conducted with the three sets viz., (a) well developed grains, (b) poorly developed grains and (c) the whole spikelets as such for each of the species of *Cenchrus*, well developed grains alone showed very good germination while the poorly developed grains failed to germinate.

The percentages of germination worked out on (a) the well-developed grains (b) the total number of germinated grains both well-developed and poorly developed out of 100 spikelets tested out and (c) the whole spikelets as such are presented in the table II.

The following are the observations that could be drawn from the data presented:

1. Whole spikelets have given the poorest germinations viz., 4·4% for *Cenchrus ciliaris;* 1% for *Cenchrus setigerus* and 6·8% for *Cenchrus* sp (Blou buffel) on an average.

2. The well-developed grains show good percentages of germinations of 87; 86·2 and 85·3 percentages respectively for the three species.

Discussion and Conclusion: Whole spikelets as such giving very low percentages of germination when compared to high percentage of germination obtained from well developed grains bring out that the involucre of bristles have some mechanical obstruction. This is further evident from the nature of the involucre in the three species under study. *Cenchrus setigerus* has the toughest involcure, *Cenchrus ciliaris* a medium tough and Blou buffel (*Cenchrus* sp) a soft involucre and the average percentages of germination are 1, 4·4 and 6·8 respectively for the whole spikelets of the above three species. When there is no appreciable difference in the setting of well-developed grains and the germination of the well-developed grains in the three species, the mechanical obstruction caused by the involucre of bristles appears to be responsible for the difference in the germination percentages of the whole spikelets of the three species. Such mechanical obstructions affecting germination have been recorded by Crocker 1906 and Shull (1911) in *Xanthium*.

TABLE I.

Percentage of grain-setting; Poorly developed and well developed seeds in *Cenchrus* sp. collected at different dates.

No.	Name of seeds	Jan. 1952		Jan. 1953		Nov. 1953		April 1954		June 1954		Average		Total
		Well developed	Poorly developed	Well developed	Poorly developed	Well developed	Poorly developed	Well developed	Poorly developed	Well developed	Poorly developed	Well developed	Poorly developed	
1	*Ceuchrus ciliaris* (local) ..	25	29	26	23	19	12	29	7	23	15	24·4	17·2	41·6
2	*Cenchrus setigerus* ..	39	6	34	4	25	14	17	13	27	13	28·4	10·0	38·4
3	Blou buffel (cenchrus sp.) ..	18	27	16	15	23	13	12	9	31	12	20	15·2	35·2

TABLE II.

Percentage of Germination in developed grains and in spikelets as a whole, collected at different dates.

No.	Species	Jan. 1952		Jan. 1953		Nov. 1953		April 1954		June 1954		Average	
		In well developed grains	In spikelets as a whole	In well developed grains	In spikelets as a whole	In well developed grains	In spikelets as a whole	In well developed grains	In spikelets as a whole	In well developed grains	In spikelets as a whole	In well developed grains	In spikelets as a whole
1	*Cenchrus ciliaris* (local) ..	84	5	92	7	79	4	93	4	87	2	87	4·4
2	*Cenchrus setigerus* ..	64	0	91	2	92	1	95	2	89	0	86·2	1
3	Blou buffel (*Cenchrus* sp.) ..	56	5	87·5	11	91	16	92	6	100	6	85·3	6 8

of black soils to the presence of titaniferous magnetite in the coarse fraction of the soil. But his work was mainly representative of black soils from Madya Pradesh and Bombay, and not of Madras. Moreover his investigation was primarily confined to the laboratory. (b) Harrison and Sivan: (1912) on the other hand, started their investigation with extensive tours of black soil areas, within Madras State, recording observations on the sub-soils and the underlying rocks. They divided the soils examined into five areas of which the Deccan was one. Laboratory examination revealed that, while the black soils were similar in properties, their origin was different in different tracts. It was also observed that the presence of titaniferous magnetite could account for black colour only in the case of Bombay soils, and not Madras soils. Thus they observed that the soils of Bombay and Madya Pradesh originated from trap rock while those of Madras traced their origin to diverse geological formations of local importance. Harrison and Sivan deduced, moreover, that the black colour of Madras soils was associated with a colloidal complex of organic matter and a double silicate of Iron and Aluminium.

The work of Harrison and Sivan made a distinct contribution to the then existing knowledge of the suject. It must however be mentioned, that their work related only to a study of surface soils with particular reference to the cause of the black colour. Although underlying rock formations were observed during the study, detailed correlation between the nature of the rocks and the soils arising therefrom had not been attempted. With the advent, two decades later, of the Russian concept of soil science, with main emphasis on the study of the soil as a unit by itself, the Chemistry Section of the Madras Agricultural Department fell in line with workers in other parts of the world, and commenced work on soil profiles opened up in representative tracts of the State.

(2) Origin of Black Soils, Tungabhadra Soil Survey: (a) *Juxta-position of Black and Red Soils:* The Tungabhadra Project area in the Ceded Districts was one of those examined elaborately by the Chemistry section. One hint that was offered by this examination was that a possible correlation could be worked out between the parent rock and the soil type it gave rise to. In a published report of this soil survey, Ramiah (1937) divided the soils of the area as black and red, deep and shallow, with and without gypsum, basing this division on criteria such as colour, depth and salt content. A striking feature observed during the

survey was the occurrence, side by side, of black and red soil patches, apparently as independent entities, with clear lines of demarcation.

This interesting phenomenon had been explained by observers in a number of ways. Some, probably under the influence of the Russian school of thought emphasizing the importance of climate, believed that topography was a determining factor; according to them, red soils were formed first and black soils were derived later from them by transportation. But during the Tungabhadra soil survey, black soils were encountered at altitudes of 1,500 feet, and vast stretches of red soils were found occurring at lower levels. Thus the topography theory was found unsatisfactory.

(b) *Conclusions from Tungabhadra Soil Survey:* The survey, with its elaborate data regarding a very considerable number (440) of soil profiles, was admirably suitable for throwing light on the associated occurrence of black and red soils, and their colour. It was deduced that, the black soil organic matter might be present in combination with calcium silicate complex of the clay. The country rocks in the area were mainly granites and gneisses; red soils were observed to be formed in the vicinity of rocks of predominant potash felspar content, while black soils were associated with other minor occurrences of hornblende schist, trap dykes, highly basic gabros, and also with limestones of Vindhyan age. Thus, it was evident that black soils were derived from rocks rich in calcium and magnesium, while red soils originated from rocks low in these elements, but high in potassium.

(3) Colour of Black and Red Soils: Ramiah and Raghavendrachar (1937) observed that both the black and red soils contained almost the same amount of iron, while, ordinarily, one would expect red soils, on account of their colour, to contain more iron. They concluded that high silica sesquioxide ratios and high lime contents were not by themselves causes of the black colour, but that this composition gives clay of light grey colour, which, in combination with even small amounts of organic matter, develops the black colour.

(4) Detailed Investigation on Origin and Geochemistry of Soils of Madras Deccan: Anantanarayanan (1941) investigated the origin of Madras Deccan soils elaborately and studied their geochemistry at length. Soil samples obtained during

the Tungabadra soil survey were utilised for the investigation. His work could be described under four broad heads.

(i) Morphology of Deccan soils, (ii) Dynamics of soils, (iii) Minerological composition of soils, (iv) Composition of clay minerals.

(i) *Morphology of Deccan Soils:* The study included a detailed analysis of the soil profile and several horizons. It was concluded that the Madras Deccan black soils were closely similar to the Chernozems of Russia and the Black Prairie soils of North America. The main difference was the dissimilarity of parent material granite for Madras soils and loess in the case of chernozems. According to the scheme of classification put forward by Sigmond at the International Congress of Soil Science, 1939, both black and red soils of Madras Deccan are soils of mixed origin, or "organic mineral soils", the former belonging to sub-group "Humic siallites" under calcium soils and main type "black soils", and the latter coming under the sub-group "Siallites", order "Red earth" and type "Red soil".

(ii) *Dynamics of Deccan soils:* The mechanism of soil formation was sought to be followed up by a study of the chemical and mechanical composition of soil types, and the parent rock responsible for their formation. It was observed that black soils had a lower free silica content and a higher combined silica content than red soils. Black soils had a higher silica-sesquioxide content than the red. They had a high content of calcium both as silicate and as carbonate as also of magnesium and sodium. Moreover, black soils had a high percentage of fine fractions, high water-holding capacity, and a low distribution of water-soluble salts in the top three feet.

Similarities noticed were (1) higher free silica content at surface, (2) increasing amount of combined silica with depth (3) constancy of silica sesquioxide ratio within the profile. These similarities point to a similarity in the extent of influence of external factors like rainfall, temperature and topography. The formation of two soil types in close contiguity may, therefore, be due to differences in the mineral composition of the parent rock, and not to external features.

(iii) *Minerological Composition of soils:* As was done earlier by Harrison and Sivan, the minerals in the course fractions of

the soil were separated, employing heavy liquid separation technique, into 3 groups of specific gravities, (1) above 2·96, (2) Between 2·96 and 2·50 and (3) below 2·50. This was combined with a detailed minerological study of the rocks underlying the soils, for gathering information regarding the influence of the mineralogical composition of parent rock on that of the soil. Minerals present in each density group were identified by their petrological characteristics. Fusion analysis was performed with the different density groups.

Striking differences were observed between minerological composition of black soil high density group, which was found to contain amphibole and pyroxene groups, and that of the red soil high density group, which contained ilmenite, biotite, epidote and garnet.

These observations lend weight to the assumption that, in the Madras Deccan area, Black and Red soils have not evolved from the same kind of rocks. Black soils appear to have been derived from from rocks rich in amphiboles and pyroxenes, characterized by presence of large amounts of hornblende and plagioclase. Red soils, on the other hand, are derived from rocks containing mica and orthoclase felspar.

(iv) *Composition of clay minerals:* Clay colloids from the two types of soil were separated by differential sedimentation, and examined elaborately. Chemical analysis showed that silicate A (completely decomposed by HCl) was present in black soil colloids, while silicate B (resistant to HCl decomposition) was present in red soil colloids. Moreover, the silica-sesquioxide ratio of the black soil colloid was about 3, while the corresponding figure for the red soil colloid was only 2. This indicates that the predominant clay mineral of black soils is Montmorillonite and that of red soils, Kaolinite.

Thus, it was proved unequivocally that parent rock was the determining factor in the case of Madras Deccan soils. While Russian pedologists emphazised the influence of climate and environment in soil formation, the mass of useful soil data collected by Madras Agricultural Chemists indicated that the climatalogical theory of the Russians need not be accepted without modifications.

Irrigability of Black Soils of Madras Deccan: (1) GENERAL CONSIDERATIONS: The emphasis on the laboratory study of black and red soils outlined above should not lead one to suppose erroneously

that the practical aspect of the problem has been overlooked. The Tungabhadra Soil Survey is a monumental attempt at translating fundamental studies into practical applications.

It was the general local belief that black soils would not respond so well and so economically to irrigation as red soils. The object of the Tungabhadra Soil Survey was to verify this assumption, and to forecast and prevent, if possible, any evil effects attendant upon black soil irrigation. Fundamental work on these soils had established their general similarity to the Russian Chernozems, which had themselves been found suitable for irrigation. But, as the horizons, and the distribution of calcium carbonate and gypsum were different from those of the Chernozems, more detailed investigations seemed to be called for.

(2) Classification of profiles on basis of distribution of calcium salts: Shiva Rau and Kasinathan (1951) paid attention to these differences between the Madras black soils and the chernozems and tried to determine the place of Madras Deccan black soils in a general system of classification. The Tungabhadra Soil Survey had revealed the existence of two obvious profiles, the gypseous and non-gypseous. A more detailed investigation brought out two main types of the gypseous profile itself. In one (Type I) gypsum was at the top, and calcium carbonate (or kankar) below, while in type II the relative positions of these calcium salts were reversed. This difference is indicative of a difference in the direction of eluviation.

Laboratory analysis for soluble salts showed that there was generally a higher concentration of soluble salts in layers near the surface in the case of type I. Moreover, it was observed that the two types were distributed over well-defined and significant areas, Type I, being absent in tracts under tank irrigation, while type II was present in such cases. These considerations hint at the difference in pedogenic factors for the two types.

(3) Probable effects of Irrigation on soils, of Gypseous Profiles: It could be reasonably inferred that the introduction of irrigation would, in the case of type II, accentuate the already existing natural trend, that is, of washing down of salts. On the otherhand, in type I the increased supply of water at the surface would result in a restoration of a typical chernozem process, or result in the concentration of alkali in the upper horizons, simulating conditions prevailing in brown steppe soils.

(4) STUDY OF CONDITIONS LIKELY TO PREVAIL ON INTRODUCTION OF IRRIGATION: The foregoing considerations indicate that the problem of irrigating Black soils of Madras Deccan is complicated, and that extreme caution is to be exercised in arriving at conclusions or offering recommendations. Therefore a detailed study of this problem was undertaken for gathering more exact information. This study consisted of two aspects: (a) complete analysis of soil samples drawn during soil survey (b) actual field experiments in a locality representative of the area. The former aspect is dealt with in the following pages. Emphasis was placed on the study of soil properties in relation to the effect of irrigation.

(a) *Mechanical Composition:* All four types of black soils (deep, shallow, with and without gypsum) were similar in containing more than 60% of fine fractions (Clay and silt) and in showing an increase in the fine fractions with depth. Further, gypseous layers possessed less of fine fractions.

(b) *Single value Constants:* Hygroscopic coefficient, maximum water-holding capacity, pore-space and absolute specific gravity, which represent single properties influenced by groups of other properties, were determined. Black soils were observed to have a moisture retaining power varying from 65–85%. Percolation and permeability were observed to be dependent upon clay content and presence of gypsum.

(c) *Total Soluble Salt Content:* This determination, which was one of the most important ones undertaken, revealed the fact that salt concentration increased up to the 4th or 5th foot, after which it began to decrease slightly. Ranges for the first three feet were (a) 0·1% (b) 0·1–0·3 and (c) 0·3–0·5% respectively, showing that at the root zone salt concentrations are well below toxic levels.

(d) *Nature of Soluble Salts:* It is well known that, more than the total soluble salt content, the quality of component salts is important in determining their effect on plants. Hilgrade and other American workers have set the limits of toxicity of sodium carbonate, sodium chloride and sodium sulphate, at 0·10%, 0·25% and 0·75% respectively.

Analytical data indicated that the limits set by Hilgrade were rarely exceeded; in the few cases where they were exceeded, the depth was well below that reached by roots of common crops.

In the gypseous profiles high concentration of salts was actually associated with the zone of gypsum concentration. Salts present at this zone were calcium and sodium sulphates, a little sodium chloride and magnesium salts, and traces of bicarbonates, carbonates being absent. In non-gypseous profiles, the gypsum was found replaced by sodium chloride, which, however, was well within toxic limits, or counter-balanced by calcium salts.

(e) *Exchangeable Bases:* The importance of exchangeable bases will be apparent when it is stated that they govern such diverse soil conditions as absorption and retention of moisture, availability of plant nutrients, formation of tilth, facility for good cultivation and range of possible crops. With the development of existing knowledge on mechanism of surface phenomena, the importance of base exchange on soil properties has gained prominence.

Thus, exchangeable calcium ions develop a crumb structure, enable a soil to be cultivated over a wide moisture range to make it possible for a number of crops to be raised. Sodium ions, on the other hand, deflocculate the soil, render it impervious to water and to plant-roots, and bring about soil deterioration to a degree unfit for crop growth.

Deep black soils with gypsum showed an average capacity of 45 to 60 milliequivalents, a figure indicating sufficiency of exchangeable bases, those without gypsum giving 45 to 65, shallow black soils with and without gypsum from 25 to 35, while red soils had capacities lower than 20. In other words, the black soils had a high base status, while the red ones had a low one.

Among the individual bases, the sum of exchangeable Calcium and Magnesium was fairly uniform throughout the profile, the exchangeable Calcium decreasing, and the exchangeable Magnesium increasing with depth, Sodium increased with depth, the increase being characteristic of the soil type examined.

(f) *Degree of Alkalization:* Puri and others, working on Punjab soils, have fixed 25% as the tolerated limit for degree of alkalization. The figures obtained for the project soil samples indicated that nearly three fourths had less than 20%, well within tolerated limits.

(g) *pH value:* This value is a measure of the intensity of soil reaction. Generally it is due to hydrolysable salts present, and

is closely associated with the degree of alkalization. Puri's observations on Punjab rice soils led him to conclude that pH values exceeding 8·5 decreased crop yields. In soils under Tungabhadra water irrigation, however, even at a pH of 9·5, the degree of alkalization was less than 25, and the yields were not affected. The reason for this difference in behaviour lies probably in the fact that Madras Deccan soils have a far higher lime status, which is responsible for increasing the pH, and, at the same, keeping down the degree of alkalization.

(h) *Examination of Soils from areas already under Irrigation:* The irrigated soils of the tract fall under three heads; black clays, loams, and sandy loams. The source of irrigation is either river or tank, the rivers being Tungabhabra and Pedda Hagari. More detailed information of the irrigability at the soils of the tract was sought from the chemical examination of soils from profile pits located in areas under irrigation.

The average total soluble salt content of Tungabhadra river waters was only 15 to 16 parts per 1,00,000, while for Pedda Hagari river and Chinna Hagari river the figures were 80 and 130 respectively. Water from the tanks of this area was also higher in salt content than the Tungabhadra. Moreover, Tungabhadra river water was free from carbonates, while the others and contained appreciable amounts of sodium and carbonates. This accounts for the fact that while wetland areas under Tungabhadra irrigation have maintained a high fertility status during the past several centuries, those under Hagari irrigation have already developed symptoms of alkalinity.

It is thus seen that the Black soils of Madras Deccan will give a very favourable reaction to irrigation with Tungabhadra water. The soil profile, with its gypseous and non-gypseous nature, the clayey condition of the soil which naturally impedes upward movement of salt solution, and above all, the high lime status and the low degree of alkalization are all points in favour of bringing the soils under irrigation. The only consideration is the quality of irrigation water, which must be free from carbonates and sodium. The Tungabhadra river water, with its low content of soluble salt, low sodium concentration and freedom from carbonate, ideally meets the situation.

Summary and Conclusions: A review of the work done by the Madras Agricultural Chemist's section on the colour, origin and properties of black and red soils, especially those of the Madras Deccan, is given. Enough data has been gathered and presented for assigning these soils a distinct place in the world group of soils. It has been pointed out that the Russian School of pedological thought is only of limited importance in the study of soil problems of the State. Results of elaborate analysis of different types of black soils and various sources of irrigation water have been presented, and their bearing on irrigability discussed in detail.

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Research Note

Fusion of Fruits in Castor (*Ricinus Communis*, L.)

Abnormalities in castor fruits with two ovules (1) and multilocular (2) condition have been previously observed and recorded by the author. In the present note another case of capsule abnormality resulting from the fusion of fruits noted in the 1954–55 rainfed season crop at the Agricultural Research Station, Tindivanam is reported.

Fusion of fruits have been recorded in apple (3) and chillies (4). In chillies it has been improperly called as fasciation. True fasciation in the fruits of tomatoes has been recorded and discussed by Krishnamurthy (5). Fasciation possibly arises from changes occurring in a simple growth area of the plant but not due to the fusion of several organs.

In castor, the inflorscence is an erect terminal branched raceme of cymes with staminate flowers at the lower portion of the flowering axis and the pestillate flowers towards the top (6). The ovaries are three carpelled with three styles. The fruit is a schizorcarp dividing into three cocci each having a single seed. Normally each capsule is attached to the rachis by means of pedicel or stalk. The stalks are short in some cases and in certain others long. Among the 'stalked' capsules there are forms in which the stalks of capsules are either branched or non-branched. Stalks, branched and non-branched occurring in one and the same inflorescence are not uncommon. The fruit-stalk in either case, bears the single tricarpellary schizocarpic fruit at the tip. But in the cases recorded here two and three fruits are found fused together at the tip of single stalk. In contrast to the rounded nature met with in normal pedicel, the fruit stalk is flattened with distinct grooves, indicating the fusion having taken place quite early from the flowering stage itself (Figures 1, 2 and 3). The fused fruits have carpels ranging from six to nine bringing out the fusion of two or three ovaries. This character was not found heritable on study.

(1) Normal capsule, (2) Two capsules fused, (3) Three capsules fused.

In one case (Fig. 2) actually seven carpels with seven seeds were noted. Of these six carpels and six seeds were normal while the seventh one was diminutive in size, corresponding to the multilocular or multicarpellary fruits, already recorded (2).

Fig. 2-a. Two capsules fused

It is of interest to note, that such fused fruits as recorded here, were observed rather frequently in typesor varieties wherein the inflorescence bears big compactly set capsules. The causes for the fusion are not exactly known.

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Reviews

What we know not about the Root Nodules of Leguminous Plants: It is often helpful to emphasise the aspect of how much we have yet to know about many things that are more or less taken for granted. The fixation of atmospheric nitrogen in the bacterial nodules of leguminous plants is an example. An attempt is made below by Dr. H. G. Thornton, a distinguished worker in microbiology, to indicate the vast field that still remains unclarified in this important branch of agricultural knowledge.

The practice of growing legumes in association with other plants is an ancient one and is much employed in primitive agriculture. Legumes comprise an important component of natural plant associations, where the nitrogen compounds formed in their nodules help to maintain the fertility of virgin soil. The amounts of nitrogen taken from the air by various leguminous crops under field conditions have been estimated by various workers and found to average about 100 pounds per acre annually. A considerable portion of the combined nitrogen is left in the soil and the soil enrichment thus produced may often last for several years.

Geologically it seems likely that the evolution and spread of nodule-bearing legumes played a vital part in the Tertiary times. The spread of legumes and the consequent improvement in soil fertility and the feeding value of the vegetation may well have contributed to the rapid evolution of mammals in the earlier Tertiary period.

The nodule bacteria are placed in a special genus *Rhizobium* in a systematic portion close to *B. radiobacter*. The morphology of the nodule bacteria is complicated by the frequency with which changes occur in cell shapes. In old cultures the majority of cells consist of small cocci; a fresh supply of suitable energy material causes these Cocci to swell and become actively motile. Apart from this, striking deviations are also met with in cell shapes, but more work is needed before such cell shape variations can be established as normal components of the life history.

The life-cycle of the organism has a bearing on the spread of the bacteria through the soil and on the infection of the host plant. At Rothamsted, the rate of spread was determined to be about 1 inch in 24 hours.

Small amounts of calcium dihydrogen phosphate added to the soil along with the bacteria accelerates the appearance of the flagellated "Swarming" stage and hastens the spread of bacteria in the soil. In fact this method of hastening the spread of the bacteria through the soil now forms part of the process of seed "inoculation" for legumes.

What is still obscure is the effect of the physical conditions of the soil, temperature and moisture upon the migration of the bacteria. These offer a promising field for investigation.

Lime exerts a benefical effect upon these nodule bacteria and the form in which the calcium is present is also very important. Calcium absorbed on clay was especially benefical, though the reason for this is still obscure.

The nodule bacteria make little growth, if supplied with synthetic nutrients. such as mineral salts and pure sugar, but require a stimulatory substance which can be obtained from legume roots, yeasts or from molassess. The first appearance of nodules occurs at the time when the first true leaf unfolds in the host legumes.

The solution surrounding the roots at this stage contains a root secretion which stimulates the multiplication of the bacteria but neither its nature nor the seat of its formation within the plant is known.

The nodule bacteria are divisible into groups, nowadays raised to the rank of species, each of which are able to infect only a limited number of host legumes. Due to this specificity of nodule bacteria, a legume crop cannot be introduced into a new district, unless the nodule organisms are also introduced into a soil, by a process known as seed inoculation.

The reason for such a specificity are not known and would repay investigation. The cause of the cell division, resulting in the formation and growth of the 'nodule' and how far the penetration by bacteria should proceed before the primary endodermis and stelar tissues are stimulated into producing nodules, are still not clear.

The method by which the bacteria are distributed through the cells of the young nodule differs in different legumes. Three main types can be distinguished; the commonest is for the bacteria to spread by means of "infection threads" which pass through the cell walls, in a second type, the bacteria infect the intercellular spaces and spread by that means. A third type is found in Lupins; here the bacteria invade meristematic cells of the young nodule itself and are carried to the poles of the mitotic spindles and thereby get distributed to the daughter-cells.

The nodules differ in many respects from bacterial roots and in particular the central mass of cells, which are densely populated with bacteria, is conveniently called the "bacterial tissue". No better instance of our ignorance can be given than this, that we are obliged to say that this "bacterial tissue" is *presumed* to be the seat of nitrogen fixation.

In spite of the fact that this subject has been studied now for nearly sixty-five years, very little progress has been made on how nitrogen is fixed inside the nodules. There is little doubt that the process is dependent on the active production of carbohydrate in the leaves; it can be stimulated by increasing the carbon dioxide supply and is checked by darkening the plant, but the nitrogen utilised by the nodules is absorbed only from the soil atmosphere and is not carried down from the leaves. Why this should be so is not known. It is also not known, what the primary product of this nitrogen fixation is. Nitrates and ammonium salts are not found in nodule bearing legumes, unless derived from the root surroundings. There is some indirect evidence that aspartic acid and lysine are among the earliest products of nitrogen fixation, but great caution is needed in distinguishing between the primary products of nitrogen fixation and the later products of metabolism.

There is also disagreement as to the method by which nitrogen compounds produced by the nodule bacteria are transferred to the host plant. A similar doubt also exists about the mode of transfer of nitrogen compounds from the legume-root system into the soil. It was formerly believed that it was effected by root decay of the host legumes, but recently it has been shown that nitrogen compounds appear outside the legume root-system, while the latter is still in the early stage of growth and before any visible root decay has taken place.

The compounds derived from nitrogen fixation by leguminous plants in their root nodule are taken up by non-legumes growing in association with the legumes, an interesting case of double symbiosis.

Infection of the roots of the host legume by nodule bacteria, the subsequent formation of the nodules and the proper functioning of the bacteria within them,

all depend upon a delicate physiological equilibrium. Infection can be completely arrested by 0·05 per cent of sodium nitrate in the solution surrounding the roots, but this can be counteracted by the simultaneous supply of sugar to the roots; thus the infection is apparently related with the carbohydrate-nitrogen balance in the root-hairs.

Under certain conditions, especially when a nutrient element like boron is deficient, the nodule bacteria actually turn upon the host plant and become parasitic upon them. Similar parasitism is produced, when the carbohydrate supply is made insufficient, by etiolation of the plants. A wide range of intrinsic differences also exist between strains of nodule bacteria and it is not yet understood why some strains fail to confer the benefits of nitrogen fixation upon the host legumes.

Individual strains also change in therir effectiveness, either increasing or decreasing, without any evident relation to the conditions of growth of the host legumes. Another lacuna in our knowledge is the geographical variation in the distribution of benefical and non-beneficial strains of nodule bacteria. In some cases, an inefficient strain in addition to being itself useless to the host, indirectly harms the host plant, by preventing the entry of useful strains. It is uncertain whether this strain competition takes place outside the plant or inside, whereby the presence of nodules containing one strain may confer an immunity against other strains of bacteria.

The above outline of our knowledge of the nodule bacteria and their associations with the host legume is intended to emphasise how great and important are the gaps in our knowledge-gaps which occur at the critical point in almost every line of investigation. The nodules on legumes afford problems, whose solution would illuminate much wider fields in biology; such as those of bacterial genetics, growth-promoting substances, and the formation of pathological growths. The great mystery of biological nitrogen-fixation itself remains unsolved.

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Gleanings

Fibre From Sesbania: It is a well known fact that Sesbania speciosa is a good leguminous green manure plant suitable for growing as a pure crop on a field scale during summer months in rice follows, and for application to paddy fields as green manure. It can also be grown along field margins in transplanted fields for obtaining green manure for the succeeding crop of paddy and also for the production of seed. In order to find out whether fibre can be extracted from Sesbania plants just like in sunnhemp, trails were conducted at Agricultural Research Station, Aduthurai and fibre extracted. The following note gives the particulars of extraction of fibre. Sesbania was raised as a pure crop by sowing seeds broadcast on 3—9—1954 at the rate of 50 lb. per acre in a ploughed and prepared wet land field. From the crop that came up, plants were cut at three different stages of growth namely, (1) just before flowering, (2) while in flowers and (3) after ripe pods were collected. Five hundred plants in each stage were cut at the ground level, dried completely and after removal of all the leaves, the stems, alone were retained and they were divided into 10 lots of 50 each and put

in water for retting. After 10 days of retting in the first two cases and after 15 days of retting in the last case, the stems were beaten in water and the fibre removed from them. From the fibre thus extracted, plough ropes, neck ropes and head ropes for animals were made and put to use on the farm. The ropes made out of Susbania fibre are found to compare favourably with coir ropes. The data collected on the above trial are furnished below:—

		Just before flowering	While flowering	After seeds are collected
Date of extraction		11—12—1954	12—1—1955	4—4—1955
Weight of fibre got from 500 plants	..	3 lb. 10 oz.	6 lb. 1 oz.	6 lb. 3 oz.
Acre yield of fibre	..	2,273 lb.	3,804 lb.	3,880 lb.
Quality of fibre	..	Fine and lustrous	Coarse and dull white	Very coarse and dull white
Cost of production of one lb. of fibre	..	Rs. 0—2—3	Rs. 0—1—6	Rs. 0—1—0
No. of days taken for retting	..	10	10	15

(D. A's. Agri. Newsletter, 1955) [A. M. K.]

Better Feeding value obtained: Treatment of Paddy Straw: Extensive experiments have shown that washing paddy straw in water offers a simple and practical method of increasing the feeding value of the straw and removing some harmful substances contained in it. Straw is first cut into pieces of convenient size and soaked in water in an earthern pot for 24 hours. It is then washed in clean water, dried and stored. The water in which straw has been washed should not be used over again, but in case water is scarce, the same water can be used over again after adding 0·05 per cent lime to it. (ICAR.—Farm News Release No. 68.)

Storing *Gur*: Use of Ash gives good results: Research conducted at the Sugarcane Research Station, Pusa (Bihar), has shown that an effective and cheap method of storing *gur* is to keep it in a thick covering of furnace ash. *Gur* thus stored remains in perfect condition, maintaining its hardness, texture, taste and colour. Since *gur* stored in this manner remains dry, the ash can be easily dusted off with a piece of cloth. Further, if the *gur* is wrapped up in gunny sacking prior to being embedded in ash, it does not lose in weight even slightly, and there will be no need to clean the surface of the *gur* before use.

(ICAR.—Farm News Release No. 69.)

Red Rot of Cane: Some Steps that Help in Control: A careful examination of sugarcane setts before planting helps to keep down red rot. Cane should be taken from plots specially raised and from where diseased clumps have been removed and destroyed, as a first step towards raising a disease-free crop. Before planting, the cut ends of the cane should be examined, and those showing even a trace of reddening should be rejected. The field in which cane is planted should also be free of red rot infection. To ensure this, agricultural experts recommend that all trash and cane stubbles of the previous crop should be carefully removed, and a rotation followed in which cane is not grown for two years subsequent to any serious red rot infection. If some canes are still found infected with the disease, the entire clumps containing the diseased canes should be removed and burnt. If infection is heavy and occurs early, then the field should be ploughed up and the setts and stubbles burnt. The field should be either kept fallow or sown with some other crop. If, however, infection comes late in the season, the crop should be cut and crushed as early as possible. In both the cases, the field should not be planted with cane for some time. (ICAR.—Farm News Release No. 70.)

Rice Borer Damage: Some Ways Towards Control: Losses to the tune of Rupees ten crores are caused annually to the rice crop in India by a single pest—the stem borer. The pest bores into the stem of the rice plant causing the

central shoot to wither and form a 'dead heart'. White ears in the plants are an indication of the damage by this pest. Though no effective method of control of the pest is yet known, agricultural experts recommend the ploughing of the field after rice harvest, collecting and burning the stubbles and keeping the bunds free of grasses in which the insect hides in the off-season, as measures which reduce the damage from the pest. Dusting the crop with four to five per cent BHC at 12 to 15 pounds per acre gives good results. (ICAR.—Farm News Release No. 72.)

Artificial Fertilizers: Precautions in Application: When applying fertilizers to crops, farmers should ensure that there is enough moisture in the soil. There should be sufficient organic matter also in the soil, as otherwise beneficial results are not obtained from the use of fertilizers. When a fertilizer containing nitrogen is to be applied as a top-dressing to a standing crop, it should be mixed with five parts of soil or farmyard manure, so that the fertilizer is diluted and does not burn the leaves on which it may drop. Top-dressing with nitrogenous fertilizers is best done after one or two weeks of the germination of the crop or the establishment of a transplanted crop. Large doses of nitrogenous fertilizers should not be applied to sandy or gravelly soils. (ICAR.—Farm News Release No. 75.)

Molasses grass (Melinis minutiflora Beauv) was introduced to Queensland some 40–50 years ago from tropical South America. The grass is a native of Africa and is now widely spread in tropical areas throughout the world. Molasses grass is a perennial tufted grass of straggling habit, each crown producing a large number of trailing stems up to six feet long and reaching a height of two feet or more. With care in management will readily control aggressive tropical weed growth. Molasses grass has a strong and distinctive smell, due to the presence in the leaf of a volatile oil. In addition, the leaves exude a sticky secretion. In Queensland the grass has shown considerable drought resistance. However, it makes its most vigorous growth on the west tropical coastal areas with good drainage. Molasses grass will tolerate acid soils but will not grow successfully on areas subject to seasonal high water table levels or on areas subject to periodic flooding.

(Queensland Agri. J., Vol. 80, p. 129, 1955.) [N. V. S.]

Mango-Hopper Trouble: Effective Check with DDT: Growers sometimes find their mango flowering profusely, but failing to set fruit. In many cases, this is due to the mango flowers getting infested with a pest known as mango-hoppers which damage them. This damage can be prevented by spraying DDT (0·16 to 0·25 per cent). Spraying should be done as soon as the bunches of flowers make their appearance in the beginning of the spring season. DDT emulsion or wettable DDT (Guesarol 550) also can be used in the same strength.

—ICAR Form News Release No. 53.

Harvesting Sugarcane Gur: Cutting Close to the Ground Advised: After sugarcane is harvested, it begins to lose in weight due to evaporation of moisture. It also loses a part of its crystalline sugar. Farmers are, therefore, advised to crush the cane for *gur* manufacture soon after it is harvested, preferably within 24 hours of cutting. While harvesting, the cane should be cut as close to the ground as possible, as the lowermost portion of the cane is the richest in sugar. Topping should be done just above the highest coloured joint. For gurmaking, however, it is better to remove the top two or three joints.

—ICAR Farm News Release No. 54.

Ammonium Sulphate for Vegetables: Time of Application: Vegetables are benefited if they are given quick acting nitrogenous fertilizers, like ammonium sulphate, once or twice as top dressing. The fertilizer should be applied near the roots, and it should not be allowed to come in direct contact with the leaves. A handful of ammonium sulphate is generally found sufficient for about a square

yard of the vegetable plot. The fertilizer should be well mixed in the soil by a light hoeing and the land irrigated immediately thereafter. The right time for top dressing is when the plants are well established and their growth is rapid. A second top dressing can also be given a little before plants start flowering. At these two periods, the food requirement of the plants is generally high, and the fertilizers will meet this demand. —ICAR Farm News Release No. 56.

Fly-Breeding in Compost; Control by Fire Treatment: Wherever compost or farmyard manure is made in pits or heaps, fly breeding is one problem that is met with. When compost is made in the vicinity of towns, this becomes a serious problem for health authorities to tackle. Experiments have shown an easy way out of this problem. All dry rags from refuse carts should be collected and spread over the pit area along with some dry refuse on the fifth day after filling the pits. These are then set to smouldering fire, which destroys all pupae of the flies which lodge in the surface layer. The operation, if repeated on the tenth day, ensures that all fly pupae that might have subsequently come up are also destroyed. Instead of rags, other materials like paddy husk, wheat straw and sawdust may also be used. Compost manure in heaps can also be similarly treated. —ICAR Farm News Release No. 57.

Irrigating Vegetables: Simple Rules to Follow: Farmers sometimes tend to over-irrigate their vegetable crops. This has been found to lead to diseases like 'damping off'. Thick sowing of seeds in a nursery also results in similar diseases. Though there can be no hard and fast rule about the frequency of irrigation, water should normally be given when the upper layer of soil shows signs of drying up. Irrigation should be deep so that the water soaks down to the root level. A shallow irrigation which leaves the root zone dry is of no value.
—ICAR Farm News Release No. 60.

Placing Fertilizers for Crops: Simple and Cheap Device: A cheap and simple device has been evolved at the Indian Agricultural Research Institute, New Delhi, for 'placing' fertilizers at proper depths for crops. Placement of fertilizers has distinct advantages over the usual method of broadcasting. This way, not only economy is effected in the fertilizers, but they are better utilized by the plants. The device for placing fertilizers consists of *poras*, which are metal or wooden tubes with a funnel attached to the top and clamped to the commonly used horse hoe. The lower end of the *pora* is bolted on to a thin iron plate bent to the shape of a U. With such a device, not only can seed be drilled with the fertilizers, but the width and depth can also be adjusted. The device can be prepared in villages and will cost about Rs. 15.—ICAR Farm News Release No. 61.

Feeding Animals with Legumes: Bloating can be Avoided: Legume fodders are rich in proteins, but they are liable to cause bloating in animals, especially in the earlier stages of growth, the degree of bloating depending upon the kind of legume fed. Experiments show that this effect can be avoided if the quantity of legume fodder does not exceed 30 per cent of the total fodder given to an animal. When berseem is the fodder used, it should be mixed with three times its weight of *bhusa* and fed. The proportion of berseem may be gradually raised so that later the animal may be completely fed on berseem alone. In case of bloating, a pound of linseed oil containing a couple of ounces of turpentine oil may be administered to the animal. —ICAR Farm News Release No. 62.

Better Legume Growth: Treatment of Seed with Cultures: Research work at the Indian Agricultural Research Institute, New Delhi, has shown that legumes like berseem, sannhemp and *dhaincha*, which do not ordinarily make good growth, would do so if the seeds of these legumes are treated with bacterial

cultures suitable to each crop. For the growth and high yields of legume crops, it is necessary for the soil to have certain types of bacteria. Where these bacteria are not found in sufficient numbers, the legume crops make poor growth. The Agricultural Research Institutes at New District Coimbatore supplies bacteria cultures suitable for treating different legume seeds to a large number of farmers every year. —ICAR Farm News Release No. 63.

Skin Colour in Sweet Potatoes: Not Related to Internal Qualities: Does the skin colour of the sweet potato indicate its other qualities? Recent work at the Indian Agricultural Research Institute, New Delhi, has shown that the colour of the skin of the sweet potato has no connection with sweetness or any other quality found in a good table variety. Most cultivated varieties of sweet potato have white or red skins. Some have brownish colour too. In North India, farmers prefer red varieties to white, while in the South, the opposite is the case. —ICAR Farm News Release No. 64.

Heat Treating of Eggs: Prolongs Storage Period: Experiments conducted at the Indian Veterinary Research Institute have shown that heating eggs in water at 130°F (melting temperature of candle wax) for 15 to 20 minutes, prevents them from being spoiled during the summer months. It is during these months that egg spoilage is the greatest. The heat treatment kills the embryo in the fertile egg and thus improves its keeping quality. Heat-treated eggs kept at room temperature during May for fourteen days were found edible and almost as good as fresh. —ICAR Farm News Release No. 65.

Rice Grasshopper: Ploughing and Dusting Recommended: Deep ploughing of field and especially scraping of the gentle slopes of the bunds, have been found to destroy a large proportion of the eggs of the rice grasshopper which damages the rice crop. The grasshopper, in some years, does serious damage to the rice crop. The pest, both in the young and grown up stages, eats away the tender leaves of the plants and even the tender grains in the ears. Dusting the hoppers with five per cent BHC at the rate of 10 to 20 pounds per acre, according to the degree of infestation, gives good results. Dusting should also be done on the grasses on the bunds to kill as many young hoppers as possible. The local Agricultural Department should be consulted for further details regarding the control of this pest. —ICAR Farm News Release No. 67.

Reinforcing the Sevak Agricultural Information 'Workshop' in Simla: An agricultural information 'Workshop', that will open up new ways of reinforcing the village level worker in Himachal Pradesh, was inaugurated on June 6 in Simla. Main emphasis in the Workshop is on the production of educational materials like phamphlets, folders, booklets and posters and visual aids that will help make village level worker a better extension teacher. The materials are based on manuscripts prepared by Himachal Pradesh Specialists on soils, vegetable crops, fruit production and other subjects important in that State. They will be prepared by a team of Himachal Pradesh and I.C.A.R. Information Officers and Artists. The materials will be reproduced on an offset printing press maintained by the Himachal Pradesh Department of Agriculture. The basic idea behind the Workshop is to increase the flow of knowledge from laboratories and experimental fields to the farmers of the State. Director of Agriculture Dr. Pushker Nath, feels that this can be done by providing village level workers with improved teaching materials and by keeping them better informed on the results of research. This will be the second State in the Indian Union to have an Agricultural Information Workshops. The first one was held recently in Madhya Pradesh which produced educational materials for the Gram Sevaks of the State. The third workshop is scheduled in Bihar from July 18 to 29 and similar sessions are planned in other States in the year. The Workshops represent a co-operative

effort of the individual State, the Indian Council of Agricultural Research and the United States Technical Co-operation Mission.

(ICAR Farm News Release No. 67 A.)

Manganese Deficiency in Vegetable Crops: *Manganese in the Soil:* Plants require very small quantities of manganese, which exists in soils combined with other elements to form several different kinds of manganese compounds. Plants normally get all the manganese they need from such compounds, but they can extract it more easily from some compounds than from others, and also more readily from the smaller manganese-containing soil particles. Thus the form in which the manganese is present in the soil is important since this determines how effectively plants can use it. A manganese-deficient soil does not contain enough available manganese for plants to make healthy growth. Certain soil conditions, such as the reaction (i.e., the degree of acidity or alkalinity), the amount of organic matter, and drainage determine the nature of the manganese compounds in the soil. An acid soil reaction favours the presence of the available forms of manganese, hence manganese-deficiency disease is rarely encountered in plants grown in strongly acid soils. However, liming by making the soil less acid, causes the manganese to be less available and sometimes makes acid sandy soils, which may contain small total amounts of manganese, manganese-deficient. Some naturally alkaline soils are deficient also, but the majority contain ample quantities of available manganese. Organic matter tends to reduce the availability of manganese, and it is noticeable that some acid soils well supplied with organic matter are particularly liable to become deficient after they have been limed. Waterlogging of the soil usually causes some of the insoluble manganese compounds to become soluble and, provided the waterlogging is only temporary, the amount of available manganese in the soil may be increased. But much soluble manganese may be washed out if the waterlogging is prolonged, consequently some badly-drained soils are manganese-deficient.

Symptoms af Manganese Deficiency: Manganese is concerned with the formation of chlorophyll – the green leaf pigment – and when manganese is deficient, the leaves of affected plants develop a characteristic yellow or pale-green mottling between the veins. Sometimes small brown spots develop in the mottled areas. Thus, manganese deficiency often can be recognized by visual symptoms which appear on the leaves of affected plants. Symptom are as follows:

Cabbage, Bruesels Sprouts, Cauliflower: The symptoms first appear as yellow and light-green patches between the veins, the veins themselves remaining green. When the deficiency is severe, the plants have a bleached appearance and only the veins are green. Sometimes, in particular with the Savoy cabbage variety, the tissue between the veins may develop a dull, brownish-grey colour. When the deficiency is acute, the plants may be stunted and may not form hearts of sprouts.

Red Beet: The symptoms in red beet crops are striking, The leaves tend to grow upright and are triangular in shape due to the curling up of the lower edges of the leaves. The leaves first develop yellow mottling between the veins, but later production of red pigment gives the leaves a faded red colour. Brownish areas may develop between the veins, and sometimes the brown tissue dies and falls out, leaving small holes. A manganese-deficient red beet crop has a characteristic reddish colour, compared with the green appearance of a healthy crop. The roots appear to develop normally, but there is a reduction in the yield of the crop, while the unattractive appearance of the leaves makes the crop unsuitable for "bunching" for market.

Peas: Affected peas show a small brown speck or a larger circular brown area in the centre of the mature pea seed, a condition commonly known as "Marsh

Spot". The plant itself on which affected peas have been found may appear healthy. However, where the condition is severe, the leaves may develop mottling between the veins.

French Beans: The leaves of French beans develop a strong yellow mottling between the veins, and the yellow areas may later develop small brown areas. A condition similar to "Marsh Spot" of peas may appear in the seeds.

Parsnips, Marrows, and Cucumbers: The leaves of parsnips, marrows, and cucumbers develop a well-marked yellow mottling between the veins, while the veins themselves remain green.

Tomatoes: Leaf symptoms appear in tomatoes only when the deficiency is acute. Yellow or pale-green mottling occurs on the younger leaves and this may spread to the older leaves, giving the whole plant a very pale-green appearance, Brown areas which may die and fall out may appear later in the mottled areas.

Methods of Control: Growers who observe plant symptoms suggesting manganese deficiency are advised to confirm the diagnosis by taking a soil sample for a reaction tests, and by asking the soil chemist and vegetable specialist to examine the affected crop.

Careful Use of Lime: Cautious use of lime is essential on the sandy soils to prevent these soils from becoming manganese deficient. Agricultural ground limestone is to be preferred for use on sandy soils to the burnt or slaked limes which tend to cause more violent changes in soil reaction.

Sulphur: Sulphur acts by making the soil more acid, so helping the plant to obtain the necessary manganese from the natural supplies in the soil. However, large quantities of sulphur may be required to reduce the reaction of heavily-limed soils sufficiently. Applications of 10 cwt. of sulphur per acre to a sandy clay loam soil of pH 6·5 have proved successful in curing manganese deficiency, but, although the method effects a permanent cure, it is not as economical as either plant or soil applications of manganese sulphate.

Sulphate of Ammonia: Ammonium sulphate also increased the acidity of the soil and is commonly used in the normal fertilizer programme. Consequently, the reaction of manganese-deficient soils will fall gradually, provided no further lime is applied, but it may take many years for the reaction to fall below pH 6·3 if the soil has been heavily limed.

Spray Application of Manganese Sulphate: Spraying the foliage with manganese sulphate is the most economical method of correcting manganese deficiency and also gives a quicker response than soil application. Affected crops may be sprayed an any stage of growth, but it is obviously an advantage if deficiency symptoms can be detected and treated at an early stage. Sprays of from 0·26 to 1·0 per cent. of manganese sulphate may be used according to the severity of the disease. Prepare by dissolving 2½ to 10 lb. of manganese sulphate in 100 gallons of water and apply this quantity per acre. One per cent, sprays have been used without causing any burning to cabbage, Brussels sprouts, and red beet crops. In cases of acute deficiency, two 1 per cent sprays applied at a fortnightly interval, each at a rate of 100 gallons per acre, may be necessary to cure the deficiency, particularly in red beet crops.

Manganese Sulphate Applied to the Soil: Soil application has its greatest value when manganese-deficient land is being prepared for susceptible crops. A dressing of 60 to 100 lb. of manganese sulphate per acre may be broadcast prior to the final ploughing of the soil. If deficiency symptoms are detected in the vegetable crops at a sufficiently early stage of growth, manganese sulphate applied to

the soil will arrest the disease. It is best to apply the manganese as a banded side-dressing between the rows not too close to the plant stems. The dressing should then be worked well into the soil in a position where it is accessible to the roots of the plants.

Danger of Manganese Poisoning: Too much available manganese in the soil is poisonous to plants and can also aggravate disorders associated with molybdenum deficiency. On deficient soils of higher reaction, the present recommendation is that manganese should be applied with each susceptible crop, but it would be wise to limit the total manganese sulphate applied on any one area to 2000 lb. per acre, particularly where efforts are being made to reduce the soil reaction by ceasing to apply lime.

(Australian Agri. News letter No. AGN/474)

Storing Gur: An Economic Method: Experiments in Uttar Pradesh show that a metal container of four to five maunds capacity with a lid having a rubber packing is the best for storing *gur*. A little lime is placed in the container to keep the air inside dry. *Gur* stored in this way occupies comparatively less space and makes transport easy. The stored product, because of its good condition, will also fetch a higher price in the market. As such containers last a long time, the overall cost of storage will also be low. —ICAR Farm News Release No. 83.

Clump Rot of Cardamom: Lime Checks Attack: Clump rot is a common disease of cardamom, usually recognised by the plain and yellowing of leaves. Diseased clumps are conspicuous by fallen leafy shoots. The trouble, as such, is often decribed as "falling off". Experiments show that applying lime at three ounces per clump in the affected plantation arrests the disease. Application of ammonium sulphate or superphosphate at three ounces per clump a month or two later is also found to stimulate the fresh growth of shoots and helps the clumps to revive quickly. —ICAR Farm News Release No. 84.

A Good Ram: Physicial Characteristics: Certain physical points indicate a ram to be suitable for heading your flock, experience points out. A good ram is muscular, vigorous and strong. Legs are short, with good bone and feet. The chest is broad and deep. The brisket or the region below the neck and between the forelimbs is wide and fleshy. The lions are abroad, and quarters thick and full. Flesh is firm and thick. A strong head and a heavy neck indicate it has musculine looks. The sex organs are well-developed. Rams of a wooly breed should, in addition, have a dense fleece of a good quality. Sheep breeders are advised to avoid rams with one of the lips protruding beyond the other, or those with week legs, or those with one testicle. —ICAR Farm News Release No. 85.

Dehydrating Potatoes: The preservation of potatoes by drying is at least 2,000 years old, but the process usually had an adverse effect on their taste and colour. Now, improved methods of dehydration can preserve potatoes so that they retain their original flavour and appearance. Under new processes developed by the U. S. Department of Agriculture dehydrated potatoes will be marketed as flakes and granules from which mashed potatoes can be made, and as potato puffs and potato-chip bars. Commercial production will begin as soon as equipment and processes which have already passed department tests are fitted to large-scale industrial production.

[Extract from COMMERCE dated 28—5—1955. (p. 1029.)]

Abstract

The Hazards of DDT-Treatment of Potatoes: Pingale et al showed that DDT was persistent on potato tubers and even after washing and boiling, carried a contamination of 12·5 p. p. m. When fed to laboratory rats, these tubers brought about disorders of the liver.

It was found from the analysis of Mysore potato tubers sold in the market that the contamination of DDT was 151·8 ± 3·1 p. p. m., ranging from 134-169 p. p. m. A left over residue of 56·3 p. p. m. of DDT was reduced to 12·5 p. p. m. on washing and boiling the tubers. According to the unofficial opinion in the U. K. the limit of DDT in foods is 7·0 p. p. m. It is warned to limit the use of DDT as insecticide on potatoes used for consumption which will give a residue over the lower limit found to be harmless. (Bull Central Food Tech. Res. Inst. Mysore, December 1954) [N. V. S.]

Carrots and Coconut Milk: Tiny isolated bits of carrot root, cut as nearly identically as possible from a position about one tenth of an inch from the cambial ring. In the best combinations of knownn utrients, these bits of carrot grew little, or not at all, but in a medium supplemented with coconut milk they grew apace. The carrot bits are rotated in specially designed tubes so that the pieces are alternately submerged and exposed to air. In media supplemented with the coconut milk, the carrot explants grow very rapidly, increasing from about the size of a pinhead to as large as a pea in 3 weeks. But the most interesting feature is that this growth is mainly by cell division 25,000 cells increase to more than a million in 8-10 days. About 1,000 cultures are commonly grown simultaneously in a temperature regulated room. The biochemical work is now being done in association with a member of the Sloan-Kettering Institute for cancer Research, and the Research has been aided throughout by grants from the National cancer Institute of the Institutes of Health.

The active substances are distinct from any known vitamins or growth regulators. They are present in coconut milk in very minute amount and are effective in very dilute solution (1 or 2 parts in a million of water). After some some hundreds of such experiments, it is known that 4 or 5 distinct active substances occur in coconut milk. These are obtainable in crystalline form to determine their nature and chemical constitution. (M. V. Sharangapani and S. V. Pingele Florida Gardener, March, 1955.) [N .V. S.]

News and Notes

The Budget meeting of the Madras Agricultural College Students' Club was held at 5-30 P. M. on 7—6—1955 with Mr. R. Balasubramaniam, Principal and the President of the Students' Club in the chair. After the discussions regarding the items of expenditure, the budget was moved and the various journals of the Club were auctioned.

The inaugural meeting of the Students' Club was held on 24th June 1955 at 5-30 P. M. Mr. D. Daniel Sundararaj, Lecturer in Botany presided over the function while Mr. N. L. Dutt, the Director of the Sugarcane Breeding Institute, delivered the inaugural address.

The inaugural address of the Debating Society was delivered by Mr. Nazareth, Additional Sessions Judge on 25th June 1955 at 5-30 P. M. in the Freeman Hall. Mr. K. P. Ananthanarayanan, Government Entomologist, presided over the function.

A debate was held under the auspicious of debating society on 27th July 1955 with Dr. M. Srinivasan as the President. The subject for the debate was "Mother tongue must be the medium of instruction for University courses". A pannel of judges consisting of Dr. M. Srinivasan, Mr. Stanley Gansalves and Mr. C. K. Rajagopalan. The house voted against the motion.

Weather Review — For the month of June, 1955.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam)	2·3	+ 0·4	15·1
	Tirurkuppam*	1·7	— 0·5	14·3
	Vellore	1·6	— 1·2	11·7
	Gudiyatham*	4·0	+ 1·1	10·4
East Coast	Palur*	1·6	— 0·2	23·9
	Tindivanam*	2·0	+ 1·0	11·6
	Cuddalore	1·3	— 0·1	22·1
	Nagapattinam	0·7	— 0 6	14·6
	Aduturai*	1·1	+ 0·2	16·6
	Pattukottai*	1·0	+ 0·2	9·2
Central	Salem	0·5	— 2·6	11·6
	Coimbatore (A. M. O.)*	1·7	+ 0·4	9·7
	Coimbatore	1·1	— 0·5	12·2
	Tiruchirapalli	1·4	— 0·2	12·2

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
South	Madurai	0·5	— 1·0	8·6
	Pamban	0·0	— 0·1	13·7
	Koilpatti*	1·0	+ 0·8	9·7
	Palayamcottai	0·2	— 0·2	9·5
	Ambasamudram*	1·5	+ 0·2	15·5
West Coast	Trivandrum	11·9	— 1·3	35·0
	Fort Cochin	39·8	+11·4	76·9
	Pattambi*	28·2	+ 0·3	50·6
	Kozhikode	39·4	+ 6·3	75·8
	Taliparamba*	33·8	— 1·1	65·4
	Wynaad*	15·8	+ 2·4	42·3
	Nileshwar*	51·7	+ 9·1	84·4
	Pilicode*	33·8	— 6·4	68·7
	Mangalore	49·3	+12·2	64·9
	Kankanady*	51·3	+11·4	67·1
Hills	Kodaikanal	4·6	+ 0·3	32·4
	Coonoor*	1·3	— 0·8	17·8
	Ootacamund*	7·3	+ 2·3	35·2
	Nanjanad *	12·8	+ 5·3	35·2

Note :— * Meteorological Stations of the Madras Agric. Dept.

During the commencement of the month a trough of low pressure existed off the Kanara coast. This extended northwards and concentrated into a depression, with its central region about 150 miles south-west of Veraval on 4—6—1955, but began to weaken on the very next day and passed away north-west-wards and became unimportant on 6—6—1955, causing considerable weakening of the monsoon along the West Coast. During this period markedly unsettled conditions were observed in the east central Bay of Bengal on 4—6—1955, but they became unimportant on the very next day, under the influence of an easterly wave moving across Indo-China. The easterly wave emerged into the east Central Bay of Bengal on 7—6—1955, causing unsettled conditions, which moved west-wards and became less marked off the Orissa-Circars coast on 10—6—1955. The axis of the monsoon trough shifted to the foot of the Himalayas on 11—6—1955, causing weakening of the monsoon along the Konkan coast. Markedly unsettled conditions were observed in the north-west and adjoining west central Bay of Bengal on 15—6—1955, causing strengthening of monsoon along the west coast, but they became unimportant on the very next-day. On the same day a low pressure area appeared over Vindhya Pradesh and adjoining south-east Uttar Pradesh, which slowly moved north-east wards and became un-important over north Bihar on 22—6—1955. Under its influence monsoon extended well over North India and was vigorous along the west-coast. An easterly wave moved into the east central Bay of Bengal on 22—6—1955

causing un-settled conditions, which developed into a shallow depression on 24—6—1955, centred about 150 miles east of Calingapatnam and merged with the seasonal trough on 26—6—1955 after weakening. Highly un-settled conditions were observed in the north Bay of Bengal near Saugor Island on 27—6—1955. But they crossed the coast on the same day, became weak and lay as a low pressure area over Vindhya Pradesh and North Madhya Bharat on the last day of the month.

Monsoon was vigorous along the coast throughout the second fort-night with widespread and locally heavy rainfall. Scattered showers occurred in Tamil Nad.

The note-worthy rainfalls and the zonal rainfall in inches are furnished hereunder:—

Note-worthy Rainfalls			**Zonal Rainfall**			
Date	Name of Place	Rain-fall in inches	Name of Zone	Average rainfall for June, 1955	Depar-ture from normal	Remarks
5/6/55	Alleppey	3·5	North	2·4	— 0·1	Just normal
15/6/55	Fort Cochin	6·1				
22/6/55	Pilicode	3·2	East Coast	1·3	+ 0·1	,,
,,	Nileshwar	5·1	Central	1·2	— 0·7	Below normal
24/5/55	Palghat	3·9				
25/6/55	Mangalore	3·9	South	0·6	— 0·1	Just normal
30/6/55	Mercara	4·3				
,,	Kozhikode	3·8	West Coast	35·5	+ 4·4	Above normal
,,	Pattambi	3·0				
			Hills	6·5	+ 1·8	do.

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 12—7—1955.

C. B. M. & M. V. J.

Departmental Notification

Gazetted Service—Postings and Transfers

Name and Present Post	Posted as
Ekambaram, C. (On leave)	D. A. O., Cuddalore
Francis, T. S., Asst., Marketing Officer, Coimbatore,	Regl. Dy. Director of Agriculture, Madurai.
Govinda Kurup, A. D., Manjeri,	Addl. D. A. O., Trichy.
Govinda Kutty Kurup, P., Pepper Specialist, Taliparamba,	Pepper Development Officer, Cannanore.
Kunhiraman Menon, P., Asst., in Chemistry, Coimbatore,	Asst., Agrl. Chemist, Manuring Trials scheme, Coimbatore.
Kasiviswanathan, M., P. A., to D. A. O., Coimbatore,	Addl. D. A. O., Pattukottai.
Kandaswami, M., Lec. in Mycology, Agrl. College, Coimbatore,	To act temporarily as Government Mycologist, Coimbatore.
Meenakshisundaram, K., P. A., to D. A. O., Guindy,	Addl. D. A. O., Madurai.
Sankaranarayana Reddy, N., Asst. Agrl. Eng., Soil Conservation Scheme, Coimbatore,	Asst., Agrl. Eng. (Research), Coimbatore.
Sayeed, P. M., (On leave)	Pepper Specialist, Taliparamba.
Swamikannu, L. Supervisor, Soil Conservation Scheme, Satyamangalam,	Asst., Agrl. Eng. Soil conservation Scheme, Ootacamund.
Sriraman, K., Secy., North Arcot, Market Committee, Vellore,	Asst., Marketing Officer, Coimbatore.
Venkatarama Iyer, S , S. D. A., Tanjore,	Addl. D. A. O., Tanjore.
Venkatasubramaniam, P. S., D. A. O., Madurai,	Vice Principal, Gramasevak Training Centre, T. Kalluppatty.

UPPER SUBORDINATES

Name and present post	Posted as
Annappan, R. S., Cotton Asst., Srivilliputhoor,	Cotton Asst., Periakulam.
Alagiriswami, M. A., A. D., Perambalur,	Extension Officer in Agrl. Alangudi.
Balakrishnan, M. P., A. D., Nannilam,	Paddy Asst., Patambi.
Balasubramaniam, R., P. P. A., (Myco.) Pattukottai,	S. D. A., Paddy, Tanjore.
Balagopalan, A. D., Gingee,	A. D., Manjeri.
Doraiswami, G., A. D., Coimbatore,	P. A., to D. A. O., Coimbatore.
Gopalan, S.,	A. D., Alangudi.

Name and present post	Posted as
Ganapathi, A. D., Tiruturaipundi,	A. D., Lalgudi.
Ganapathi, T., Spl. A. D., Udamalpet,	A. D., Coimbatore.
Haridoss Menon, K., A. D., Palakode,	Paddy Asst., Pattambi.
Krishna Iyer, C. S., Cotton Asst.,	Cotton Asst., Srivilliputhoor.
Kunjamma, V. K., Asst., in Millets, Coimbatore,	Librarian, Agrl. College, Coimbatore.
Kandeswami, T. K., Spl. A. D., Pugalur,	P. P. A., Mycology, Pattukottai.
Krishnaswami Rao, T. B., F. M., A. R. S., Koilpatty,	Cotton Asst., Koilpatty.
Kolandaiswami, M. S., Ext. Officer, Alangudi,	A. D., Perambalur.
Kutty Mudaliar, K. S., F. M., Central Farm, Coimbatore,	A. D., Coimbatore.
Lakshmi Ramakrishnan, Asst., in Tuber crop, Coimbatore,	Asst., in Mycology, Coimbatore.
Narayanan Nambisan, P. K., A. D., Mattur,	Paddy Asst., Pattambi.
Narayanaswami, K. R., P. A., to D. A. O., Pattukottai,	P. A., to D. A. O., Guindy.
Rajaraman, N. S., A. D., Lalgudi,	A. D., Alangudi.
Rakana, G. V., P. A., to D. A. O., Trichy,	A. D., Trichy.
Ramakrishna Nambiar, C., Coconut Nursery, Asst., Tikkotti,	Oil Seed Asst., Nileshwar.
Sivasubramaniam, P. K., A. D., Alangudi,	P. A. to D. A. O., Trichy.
Samuel, C. D., Spl. A. D.,	F. M., Satyamangalam.
Sankarasubramaniam, P. A., to Tirunelvelly,	P. A., to D. A. O., Pattukottai.
Sivasubramaniam Udayar, A. D., Alangudi,	A. D., Gramasevak Training Centre, Gandhigram,
Shanmugam, S. P., A. D., North Arcot District,	A. D., Perungathur.
Sundaram Pillai, K., A. D., Coimbatore,	A. D., Pollachi.
Thyagarajan, N. P. P. A., Myco. Betelvine Scheme, Velur,	P. P. A., Myco., Cuddalore.

DISTRICTS
S. ARCOT; COIMBATORE
MALABAR; S. KANARA
RAMANATHAPURAM
TIRUNELVELI
NORTH ARCOT

CROPS
COTTON; GINGELLY
GROUNDNUT
COCONUT
ARECANUT
TOBACCO

Review of Market Conditions for Commercial Crops in the Areas of Market Committees During June 1955

Cotton: (In this Section: Candy 784 lb; Bale 392 lb; Pothi 280 lb.) The cotton market at Tiruppur started with a carry over stock of 8,359 candies of Cambodia and 2,509 candies of Karunganni lint in the month, while arrivals totalled to 7,894 candies of Cambodia and 1,571 candies of Karunganni lint inclusive of 552 candies of lint obtained from Salem, Tiruchirapalli and Madurai districts. Despatches from Tiruppur accounted for 6,996 candies of Cambodia and 1,470 candies of Karunganni lint of which 589 candies went out of the notified area to places like Bombay, Ahmedabad, Travancore-Cochin State and other districts within the State. The closing stock was of the order of 9,257 candies of Cambodia and 2,610 candies of Karunganni lint at the end of the period under review.

The kapas market at Tiruppur opened with 30,308 pothis of Cambodia and 50,905 pothis of Karunganni as carry over stock of previous month. Arrivals during the month accounted for 8,369 pothis of Cambodia and 1,179 pothis of Karunganni kapas while disposals of 23,954 pothis of Cambodia and 3,129 pothis of Karunganni were effected leaving a closing balance of 14,723 candies of Cambodia and 3,145 candies of Karunganni lint.

In general the market for both lint and kapas of either varieties revealed indications of a little slackening as to market arrivals usual at this part of the year.

In Koilpatti market there was an opening stock of 3,000 pothis of Karunganni kapas while fresh arrivals amounted to 5,000 pothis during the month. Nearly 7,000 pothis were ginned and disposed to mills leaving a stock of 1,000 pothis at the closing of the month.

The three markets at Virudhunagar, Sathur and Rajapalayam opened with a total quantity of 180 candies of Karunganni lint. About 3,104 cds. of lint including 2,705 candies of Karunganni, 109 candies of Cambodia and 290 candies of Uganda arrived into these markets during the month. After the disposal of a total of 2,654 candies of lint a quantity of 630 candies of Karunganni lint was left over at the end of the month.

The transaction of kapas in the above three markets opened with a carry over of 1936 pothis of which 1920 pothis were Cambodia and 16 pothis Karunganni. The arrivals during the month totalled 30,849 pothis (27,750 pothis of Karunganni and 484 Cambodia and 2,615 of Uganda). Disposals accounted for 32,435 pothis on the whole leaving a stock of 350 pothis of Karunganni kapas at the month end.

Prices (Lint): At Tiruppur the rates for Karunganni lint opened at Rs. 881/- per candy and were seen fluctuating between Rs. 880—893 during the month. At Virudhunagar the market remained more or less steady at Rs. 680—720 a candy for different qualities.

Cambodia Kapas: The prices of kapas at Tiruppur showed a slight decline and ranged from Rs. 107/- to 112/- per pothi. At Virudhunagar market the kapas rates maintained a steady tone and remained at Rs. 70-77/8 per pothi.

Karunganni Lint: The prices of lint at Tiruppur remained steady at Rs. 705/- to 735/- per candy revealing a decline by Rs. 25/- over the rate of the previous month. At Virudhunagar the market rates for the different varieties of Karunganni were of the following order.

K2	Rs.	700—720	per candy.
Karunganni best	„	660—690	„
Average type	„	630—656	„
Tinni-Karunganni Mixture	„	600—620	„

Karunganni Kapas: The price of Karunganni kapas at Tiruppur ruled steady at Rs. 75—80 per pothi. The prices at Rajapalayam and Virudhunagar ranged at Rs. 70—83 for 1st crop and Rs. 57—68 for 2nd crop.

Cotton Seeds: The prices of Karunganni cotton seeds in Virudhunagar market gradually rose from Rs. 13/- to 15 to Rs. 19/- to 20/8 per pothi of 252 lb. The rates for Cambodia seed also showed some improvement and ruled at Rs. 10/8 to 13/8 per pothi of 252 lb.

Groundnut: (Candy in this section means 531 lb. of kernels and bag 80 lb. of pods.) The groundnut markets in South Arcot district opened with a stock of 2,706 tons of kernels. Arrivals in the eight regulated markets totalled 6,049 tons which included 1,827 tons from other districts and 327 tons from outside the State from Andhra. A quantity of 5,242 tons of groundnut kernels was disposed of to local millers and another 213 tons were taken up by village ghannis, while 339 tons and 38 tons were despatched to places outside the district and outside the State respectively. A closing stock of 2,587 tons was left at the month end.

In North Arcot district the stocks with the growers, merchants and at important assembling centres all put together are placed at 6000 tons of pods. Of this 1800 tons were converted into kernels for sale. The disposal in kernel is put at 650 tons inclusive of small despatches outside the district.

The average prices of kernels in the different markets of South Arcot district ranged from Rs. 95/3 in Villupuram market and Rs. 106/4 at Cuddalore per candy. Prices in North Arcot district were in the region of Rs. 88 to 98 per candy and considered as an improvement over the level of previous month but not so compared to the rates of last year during the corresponding period which stood at Rs. 140/- to 145/- per candy. The prices at Virudhunagar market ruled steady at Rs. 103 to 108/- per candy revealing a slight upward trend over the rates of last month.

Gingelly: (Bag in this Section: 2 Mds. each of 82$\frac{2}{7}$ lbs.) During the month the markets in South Arcot district started with an opening balance of 372 bags estimated to be available with the traders. 490 bags were received in all the Regulated Markets of which Virudhachalam alone accounted for 384 bags. Receipts from outside the district came to 105 bags while there were no arrivals

from other States. The disposals included 9 bags sold to Oil millers and 343 bags to Country chekkus. The month-end stock stood at 375 bags.

The prices of Gingelly remained more or less steady and were in the region of Rs. 37—14—0 to 41—14—0 per bag.

Coconut: The four markets in Malabar (Kozhikode, Badagara, Ponnani and Tellicherry) opened with a stock of 4·4 million nuts of the previous month and received 7·3 million nuts during the month. Total disposal by way of local sales and despatches amounted to 5·2 million nuts leaving a closing balance of 6·6 million nuts. Arrivals of coconuts into Manghlore market were considered normal.

Prices in Malabar market ranged between Rs. 92/- to 135/- per 1000 husked nuts. The rates at Mangalore stood varying between Rs. 165–200 for Raw and Rs. 165–200 for dry nuts per 1000.

Copra: (candy in this section is 700 lb.) The opening balance of copra at Kozhikode and Badagara accounted for 3135 candies and 2610 candies were received into these markets during the month. Of the total disposal of 3709 candies, 1767 candies were despatched to other places. The month end stock of 2036 candies were left over in the markets of Kozhikode and Badagara.

The prices of copra showed some improvement during the month. The price fluctuations as between different varieties are extracted below.

(Prices in Rs. per candy of 700 lb.)

	Kozhikode		Badagara	
Varieties	Maximum	Minimum	Maximum	Minimum
Office	330	305	315	300
Edible	355	342	325	310
Rajapur	430	425	420	420
Madras	385	375	375	375

At Mangalore also the prices showed a little improvement and were in the range of Rs. 297/- to 318/- per candy.

Arecanut: Mangalore market opened with a stock of 2942 cwts and 9101 cwts were added to this by fresh arrivals. Disposals

and exports accounted for 8743 cwts leaving a closing stock of 3300 cwts.

The prices of Supari which opened at Rs. 140–160 per cwt improved steadily and touched Rs. 155–172 towards the closing of the last week of the month. The rise in prices is ascribed to better demand and low stock position in the market. The price ranges of Supari in Mangalore market are extracted below :

(Price in Rs. per cwt.)

Varieties	Maximum	Minimum
Mangalore Supari	172	140
Malabar ,,	155	125
Koka ,,	135	90

The stock of arecanut at Kozhikode and Ponnani markets at the beginning of the month was estimated as 565 bags (100 lb each) and 2961 bags were received further during the month. Disposals both by way of local sales and despatches were in the order of 40 and 2508 bags respectively leaving a closing balance of 978 bags at the end of the month. The prices were ranging between Rs. 146–165 per bag and revealed satisfactory gain over the levels prevailing in the last month.

A regulated market for arecanut was opened at Kuttipuram near Tirur on 8—7—1955 by the Minister for Agriculture and it is expected that sizeable transactions will be handled in on Arecanuts produced in the neighbourhood mostly in Ponnani taluk.

Tobacco: (candy in this section is 500 lb.) In Coimbatore district during the month a quantity of 4890 condies of chewing and 1,456 candies of cheroot tobacco were disposed of to merchants outside the district and despatched to destinations like Palghat, Ramanathapuram, Travancore-Cochin State, Vellore, Tirupathur, Madras, Tiruvarur and Pudukottai. The month end stock was estimated to be 13,535 candies of chewing and 4,245 candies of cheroot tobacco.

The tobacco continued to rule firm as in the previous month. Prices of the different varieties that prevailed during the month were as extracted below.

(Price in Rs. per candy)

Varieties	I Grade	II Grade	III Grade
1. *Chewing varieties*			
(Sun cured)	4		
(a) Meenampalayam	450—500	350—430	200—300
(b) Other varieties	400—425	250—325	190—240
2. *Cheroot varieties*			
(Sun cured-grown in Erode and Bhavani taluks)	200—240	140—180	100—120
3. *Chewing varieties*			
(Pit cured-grown in Palladam and Sulur areas)	190—220	150—180	100—140

Compiled by
The State Marketing Officer,
Madras.

Activities of the Market Committees during the month of June 1955

I. Of the seven Market Committees in the State only five in the districts of North Arcot, South Arcot, Coimbatore, Malabar and South Kanara continue to be actively functioning. The activities of the committees at Ramanathapuram and Tirunelvely continue to be restrained due to the injunction order of the Madras High Court.

The following progress was made by the Market Committees during the month in the issue of licences under Madras Commercial Crops Market Act.

	Section 5 (1)		Section 5 (3)		Weighmen		Brokers	
	A	B	A	B	A	B	A	B
North Arcot Market Committee	46	710	16	313	9	279	...	10
South Arcot Market Committee	64	1543	95	1322	34	512	...	5
Tirunelveli Market Committee	...	36	...	15	...	17	...	...
Coimbatore Market Committee	27	70	34	102	...	...	...	...
Malabar Market Committee	20	305	38	970	22	126	...	5
South Kanara Market Committee	9	204	8	171	1	38	...	...

(A — During the month B — Upto month)

The total of transaction in commercial crops in 13 Regulated Markets in the State during June, 1955 is shown consolidated below:

Crop	Quality	No. of Regulated Markets
1. Groundnut kernel	3951 tons	10
2. Gingelly	539 bags (2 Mds. each 82$\frac{2}{7}$ lb.)	5
3. Cotton lint	455 candies of 784 lb. each	3
4. „ Kapas	282 Pothis of 282 lb. each	3

II. **Meetings:** No meetings were held by either by South Arcot Market Committee or Malabar Market Committee during the month. The other committees are functioning under the respective collectors of the district under Section 6A of the Madras Commercial Crops Market Act.

III. **Special Features:** A regulated market of Malabar Market Committee for Arecanut was declared open at Kuttipuram by the

Minister for Agriculture on 8—7—1955. The function was largely attended by growers and traders and other prominent people of Malabar.

IV. **Quality Appraisal:** South Arcot Market Committee continued its work on the studies on the quality of groundnut kernels marketed in six of its regulated markets including Panruti on the basis of random sampling. A total of 697 samples of kernels were drawn and analysed from arrivals with six regulated markets from 13,923 lots comprising 3,795 tons. Some details of the results of analysis done in six markets during the month on dryage and total refractions (comprising of (1) Dirt and Foreign matter (2) Nuts in shell (3) Damaged ones (4) splits (5) Brokens and (6) shrivelled are of interest and are extracted below.

MARKETS

Particulars	Panruti	Cuddalore	Villupuram	Tindivanam	Tirukoilur	Vriddachalam
1. *Dryage:*						
2% and below	21	4	2	34	31	80
3% ,,	2	21	2	17	..	30
4% ,,	9	26	6	18	29	7
5% ,,	8	34	3	11	20	2
6 to 10%	34	65	64	19	..	2
Over 10%	23	6	13	5	...	2
2. Total refractions on						
4% and below	72	71	50	..	90	113
5% to 8%	2	80	36	13	48	7
Over 8%	..	5	4	91	..	12

From the details seen above the quality of Groundnut kernel marketed at Vriddachalam seems to be superior in points of dryage and also on basis of total refraction. There is excessive total refraction at Tindivanam while the quality factors of Cuddalore arrivals are of average type. These data are being collected and will be statistically interpreted in due course for the benefit both the producers as well as traders.

(From the State Marketing Officer, Madras)

Sale of Groundnut in North Arcot District

by

K. SRIRAMAN

Secretary, North Arcot Market Committee, Vellore

Out of a normal production of one lakh tons of groundnut kernels in North Arcot district about 5,000 tons are utilised for edible purposes. Nearly 12,000 tons of kernels are required for seed material and this quantity is sold as pods in the villages. The rest 83,000 tons are assembled in the various centres, as pods or as kernels and sold either directly or through commission mundies or have them auctioned in the decorticating premises to the consumers like the exporters and the oil crushers or to the merchants. The Statement I below, gives an approximate idea of the quantities involved in the different methods of marketing groundnut obtained in North Arcot district.

STATEMENT I

(In tons of kernels)

Assembling Centres	Quantity normally assembled	Sold directly to consumers or merchants		Sold through commission mundies as kernels	Sold in the decorticating premises as kernels
		as pods	as kernels		
(1)	(2)	(3)	(4)	(5)	(6)
Thiruvannamalai Tq.					
Thiruvannamalai	13,000	4,500	500	3,000	5,000
Thiruppathur Tq.					
Thiruppathur	10,000	7,000	500	500	2,000
Gajalanaickenpatti	1,000	1,000	..	..	..
Vaniyambadi	2,000	..	..	2,000	..
Arni Tq.					
Arni	9,000	5,000	..	..	4,000
Vellore Tq.					
Vellore and Katpadi	4,000	..	2,500	1,500	..
Ambur	500	..	500	..	..
Wallajah Tq.					
Arcot	7,000	2,000	4,000	..	1,000
Ammur	1,000	1,000	..	..	..
Kalavai	2,000	2,000	..	..	..
Thimiri	1,000	1,000	..	..	..
Polur Tq.					
Polur	1,500	1,000	300	100	100
Chetput	2,500	2,500	..	..	..
Kalambur	1,500	1,500	..	..	..
Santhavasal	1,000	1,000	..	..	..

(1)	(2)	(3)	(4)	(5)	(6)
Gudiyatham Tq.					
Gudiyatham	8,000	6,000	2,000	..	..
Peranambut	1,500	1,500	..	..	..
Cheyyar Tq.					
Cheyyar	3,500	3,500	..	..	..
Kovilur	1,000	1,000	..	..	..
Wandiwash Tq.					
Wandiwash	2,000	2,000	..	..	..
Desur	1,000	1,000	..	..	..
Other centres	21,600	21,000 (12,000 for seed)	..	..	..
Total	95,000	65,500	10,300	7,100	12,100

It is seen that most of the sales is as pods direct to the consumers are merchants. Of late, the auction sales in the decorticating premises is coming into prominence. This has affected the business of the commission mundies. The relative merits of these methods are discussed in the following paragraphs.

Nearly two-thirds of the production of groundnuts in North Arcot district (65,500 tons) is generally purchased during the season as pods, by the big merchants or the consumers like the exporters of kernels or oil crushers, in the assembling centres like Tirupattur, Arni, Thiruvannamalai, Gudiyatham, Cheyyar, Chetput and Kalavai. When better prices are offered later in the season, they are sold or exported. In this system of sales, the merchants mainly depend upon the possible rise in prices, with the advancement of the season and hence stake their all, by outright purchases at the beginning of the season in October to December. The poor agriculturist is unable to withold his stocks till better prices are offered and hence sells his produce to the merchants, soon after harvest. Sale as pods (65,500 tons) is more prevalent than sale as kernels (10,300 tons) is more prevalent than sale as kernels (10,300 tons) and the author has already drawn attention to the losses incurred by the agriculturists in such transactions (Madras Agric. J. Vol. XLII, p. 85). Formation of growers' co-operative societies, which can advance monies on produce pledged and market the produce at advantageous prices at a later date would go a long way in improving the income of the agriculturists.

The system of sale through "commission mundies" is prevalent in certain places like Vellore, Thiruvannamalai and

Vaniyambadi where nearly 7,000 tons of kernels get marketed this way. The villagers bring their produce to known "mundies", from which they might have taken advances for cultivation or for other family expenses. If not already taken they would take some advance, at the time the produce is brought to the mundy. The commodity is left at the mundy for sale which may take place at times even after about a month or two. Mostly the sales are effected within a fortnight. The commission mundy owner gives advance loans, supplies empty gunnies for bringing the produce and accommodates the bags in his godowns till sales are effected. For all these services, he charges some commission which is readily paid by the agriculturist as it saves a lot of worry for him. Thus, the commission mundy owners play an important part in financing, assembling and storing groundnuts. In this system, the agriculturists are compelled to market their produce, through the commission mundies only, though they know fully well that the mundy owners are exploiting them and are making large profits at their expense. Aid by the Reserve Bank of India to give loans to the agriculturists in advance for cultivation, through the State Banks or the Co-operative Societies on their executing a bond, to bring their produce for sale to the recognised places of sale like the regulated markets or the co-operative sale societies would be of great adventure to the agriculturists.

Of late, the system of decorticator owners finding purchasers, for the decorticated produce in their mills, is prevalent in places like Tiruvannamalai, Arni, Tirupattur and Arcot. Nearly 12,000 tons of kernels are being sold in this manner at present, and is likely to be more popular at the expense of the commission mundy business. At all these places except Tiruvannamalai, the decorticator owners send word to the traders and oil mill owners intimating the availability of kernels for sale. Persons interested, peep in at their leisure and strike a bargain, if favourable. The villager, being new to the current conditions expects the decorticator owner to assist him in disposing off the produce quickly and at a favourable price. A commission is charged for such a service and some times it is done free also. In this system, the villager is entirely dependent on the honesty of the decorticator owner. This method can be improved by establishing a regulated market where all the produce can be assembled and sanctioned to fetch the best price.

At Tiruvannamalai, the method of sale in the decorticating premises, is a little improved. In this place, there are more than

a dozen decorticators, daily shelling pods and offering the kernels for sale. The oil crushers and the exporters of this district and form outside, daily start during the season, at about 4 p.m. from one end of the town in a group. When thay enter a decorticator premises, the lots there are auctioned one by one by the decorticator owner following the close bid system. For each lot, the would-be purchasers offer their price in writing to the decorticator owner. The bid chits are arranged according to the price offered and a second chit increasing the price, is allowed if a purchaser finds that his chit has gone down in the order. The highest bid offered, is considered by the decorticator owner and the owner of the produce jointly and is either accepted or rejected. The next lots are auctioned one by one on the same pattern. After finishing the lots available in one decorticating premises, the would-be purchasers move on as a body to the other decorticating premises one by one till they finish all the available lots in the town. In this system, there are some defects. The decorticator owner is able to choose the purchaser, by refusing to part with a lot, for a particular price and selling the same, the next hour, to a man of his choice, without auction, for the eame price. This kind of manipulation is very unhealthy, as no sancity is attached to the auctions held. The most important objection to this system is that the price levels of each purchaser, is liable to be disclosed, even in the first few bids, in a decorticating mill. In order to avoid exciting the market, the best bids would not be forthcoming in the first rounds, and hence, the price fetched in the first few mills visited are mostly low. As the purchasers move on, the tempo increases and the parties would have sensed the market position and the bids in the end places would be fashioned after that day's existing conditions. In a rising market the end mills would get better prices than the first mills while in a falling market the first mills may sometimes have the advantage. It was observed on one day that while the first bids in the first two mills was only Rs, 95/- per candy, it rose up to Rs. 109/- in the end mill, for 'pucca' quality of kernels, per candy of 531 lb. as there were favourable advices from the Madras market that day. On another day, the bid started at Rs. 110/- and came down to Rs. 95/- per candy of kernels as the market advices were weak. The information given in the day's morning papers, the advice given in the letters received by the parties that day, the availability of the stocks, the study of the requirements of the various parties assembled, and the rivalry of the concerns, play a great part in deciding the prices and their trend. Perhaps

this defect may be partly rectified, by asking the bidders to go round all the decorticating premises and give their close bids all at a time in a central place. Better still, an arrangement where all the lots of groundnuts offered for sale, could be assembled in a central place for auctioning by the close bid system would be welcome. This is just the idea of a regulated market. The purchaser can go round and estimate the arrivals and the quality and then declare his maximum prices for each lot in a slip according to his requirements. In this system the maximum bids would have to be given by all at the same time, being in the dark about the market conditions. The grower would thus get the best price for his produce. Perhaps the defect in this system may be that the purchaser is not sure of the quantity he would be getting, as the acceptance of his bid depends upon the other bids. At times, he gets more stocks than he wishes for, while at other times, he is not able to cover his requirements. Yet another defect that may be pointed out is the cart-fare involved in transporting the groundnuts from the decorticating premises to the central market. This can be rectified, if bids are allowed on samples or on standard specifications.

The above kind of assembling groundnuts in a central place called the regulated market, and auctioning the produce daily by the close bid auction system, has been successfully adopted by the South Arcot Market Committee for the past fifteen years. The growers themselves bring their produce to the regulated markets for sale and the consumers like the oil mill owners and the exporters find it extremely easy to have their purchases effected expeditiously and according to their requirements. The commission mundies have mostly gone out of trade in South Arcot district and at present nearly 95% of the produce grown is marketed by the growers themselves through the eight regulated markets established by the South Arcot Market Committee throughout the district. The North Arcot Market Committee, started about an year back, has also arranged for such a system of assembling and auctioning of groundnuts in North Arcot district at the regulated markets of Vellore and Tiruvannamalai. Three more regulated markets would be started at Tirupattur, Arni and Arcot in the near future.

While the market committees are able to effectively dispose of the produce at an advantageous price to the agriculturists and also be of service to the traders by assembling them at a place for their close scrutiny and appraisal of the market conditions, the problems of long duration storage and financing remains untackled,

as these functions are beyond the the scope of these regulated markets as envisaged by the Madras Commercial Crops Markets Act 1933. The co-operatives can step into this gap and be of great service to the groundnut trade. The starting of bonded warehouses conforming to the Madras Warehouses Act, under the management of the co-operatives would be a useful step in tackling the problem of storages. It is stated that the Reserve Bank of India contemplate provision of loans to the agriculturists even for meeting the cultivation expenses. Such a move would solve the problem of financing.

The combinatisn of the co-operative movement and the maaket committees can be expected to wean the agriculturist from the obligations of the commission merchants. This does not mean that the commission merchants should not exist. They have also got their functions in the marketing of groundnuts. They can advance monies to the few needy agriculturists that cannot pledge any produce but would require capital for cultivation. Such produce brought to their mundies can be sold at the best prices, comparable to the prices obtained in the regulated markets. For the services rendered, they can charge a reasonable commission. Under the Madras commercial Crops Markets Act, in the notfied areas the maximum commission charges are fixed by the market committees. They can also advance monies temporarily on the produce pledged by the traders, after purchase in a regulated market. When the outside purchasers book in large quantities than their requirements, they necessarily fall short of the money required for payment immediately and also may find it difficult to move their produce expenditiously from the regulated market. The co-operatives may take time to accomodate such urgent cases, and the commission merchants, can be useful in this direction.

There cannot be prescribed any hard and fast system of sale for each commodity or place. The best policy would be to improve the existing conditions, by slowly organising regulated markets and bonded warehouses so that the growers may get fair prices for their produce, while the traders may by enabled to gauge the situation and offer remunerative prices for the quantities required by them.

Crop and Trade Reports

Cotton—1954-'55 Fifth and Final Forcast Report, Madras State: The area under cotton upto 25th March 1955 for the Madras State is estimated at 8,71,700 acres. Compared with the finally recorded area of 8,59,000 acres for the previous year and an average area of 7,84,200 acres calculated for the five years ending with 1953-'54, this is an increase of 1·5 per cent and 11·2 per cent respectively. An increase in area is estimated in all the districts of the State except in North Arcot, Malabar and South Kanara and the Nilgiris. The area estimated is the same as that last year in North Arcot, Malabar and South Kanara districts and the area in the Nilgiris district is little and negligible. Pickings of cotton is in progress. The crop was affected by insufficient water supply in the later stages of its growth in the districts of North Arcot and Ramanathapuram. It was also affected by pest attack in the districts of Coimbatore. The condition of the crop in the other districts is generally satisfactory.

The yield per acre is estimated to be slightly higher than that of last year. The seasonal factor for the State as a whole works out to 92 per cent of the normal as against 91 per cent for the previous year. On this basis, the total yield works out of to 2,70,500 bales of 392 lb. lint for the previous year and an average yield of 2,61,000 bales for the five years ending with 1953-54, representing an increase of 2·2 per cent and 3·6 per cent respectively. It is however too early to estimate the yield with accuracy as much will depend upon the future weather conditions and their effect on the second crop.

The estimated area and yield of cotton by varieties in the current year, together with the corresponding figures for the previous year are given below:

Variety		Area in '00' acres		yield in '00' bales of 392 lb. lint	
		1954—55	1953—54	1954—55	1953—54
Madras American (Cambodia)	Irrigated	1101	1390	729	938
	Unirrigated	1047	1290	279	338
Madras American (Cambodia-Uganda)	Irrigated	477	170	319	119
	Unirrigated	758	461	188	110
	Total Cambodia	3383	3311	1515	1503
Uppam in Central districts		641	632	104	127
Nadam and Bourbon		5	5	*	*
	Total Salem	646	637	104	127
Tirunelvelies (a)		1075	1065	265	228
Karunganni		3613	3577	281	788
	Total	4688	4642	1086	1016
	Grand Total	8717	8590	2705	2646

*Less than 50 bales.

(a) Includes mixed country cotton grown in the South.

The wholesale price of cotton lint per standard maund of 82 2/7 lb. or 3,200 tolas as reported from certain market centers on 30—4—55 was Rs. 88—12—0 for Coimbatore Cambodia Rs. 73—7—0 for Coimbatore Karunganni, Rs. 84—11—0 for Cambodia at Erode and Rs. 65—10—0 for Tirunelvelies. Compared with the prices which prevailed in the corresponding period of last year, these prices reveal a decrease of 21·4 per cent in the case of Tirunelvalies, 18·7 per cent in the case of Coimbatore Karunganni, 10·0 per cent in the case of Cambodia at Erode and 9·8 per cent in the case of Coimbatore Cambodia.

Ginger—Third and Final Forcaste Report—1954-'55—Madras State: The area under Ginger in 1954-55 in the Districts of Madurai, Malabar, South Kanara and the Nilgiris is estimated at 14880 acres. Compared with the area of 15250 acres estimated for the corresponding period of last year it shows a decrease of 2·4 per cent. Compared with average area of 13490 acres calculated for the previous five years ending with 1953-'54 the present estimate reveals an increase of 10·3 per cent. An increase in area is estimated in the districts of Madurai, South Kanara and the Nilgiris and a decrease in the district of Malabar. The yield per acre is estimated to be normal in the districts of South Kanara and the Nilgirics and slightly below the normal in the districts of Madurai and Malabar. The total yield is estimated at 5090 tons of dry ginger. Compared with the estimated yeild of 5440 tons of dry ginger for the corresponding period of last year it is an decrease of 6·4 per cent. Compared with the aveage yield of 4530 tons of dry gingor calculated for the provious five years ending 1953-54, the present estimate reveals an increase of 12·4 per cent.

The wholesale price of dry ginger per maund of 82 2/7 lb. or 3200 tolas on 5—3—1955 was Rs. 91—14—0 at Mangalore. Compared with the price in the corresponding period of last year this is an increase of 85·2 per cent.

Sugarcane Fourth and Final Forecast Report—1954-'55—Madras State: The area under Sugarcane in Madras State during 1954-55 is estimated at 1,10,700 acres (95,930 acres under planted crop and 14,770 acres under ratoon crop). Compared with the finally recorded area of 90,020 acres (78,190 acres under planted crop and 11,830 acres under ratoon crop) for the provious years, this is an increase of 23·0 per cent. Compared with the average area of 98,130 acres for the previous five yeares ending with 1953-54, the present estimate is an increase of 12·8 per cent. The increas in area this year is due to favourable seasonal conditions at the time of planting. A decrease in area is estimated in the districts of Ramanathapuram, Tirunelvely, Malabar and South Kanara and an increase in the other districts of the State except the Nilgiris where the acrage under the crop is little or negiligible. The crop has been harvested or is being harvested in many districts. The yield per acre is slightly lower than that of last year.

The seasonal factor for the State as a whole works out to 95 per cent of the normal as against 96 per cent of the normal estimated for the previous year. On this basis, the total yield works out to 28,61,180 tons of cane, gur equivalent of which is 3,12,310 tons as against 23,39,010 tons of cane with a gur equivalent of of 2,54,900 tons estimated for the previous year representing an increase of 22·5 per cent. Compared with an average yield of 24,12,810 tons of cane with a gur eqvivalent of 2,64,830 tons calculated for the previous five years ending with 1953-54, the present estimate shows an increase of 17·9 per cent. Tha average wholesale price of jaggery per maund of 82 2/7 lb. or 3,200 tolas at important market centers on 7—5—1955 was Rs. 14—11—0 in Mangalore, Rs. 8—0—0 in Tiruchirapalli, Rs. 6—4—0 in Salem, Rs. 7—9—0 in Cuddalore and Rs. 7—4—0 in Vellore. Compared wlth the prices which prevailed in the correponding period of last year, these pricos show a fall of 60·0 per cent in Salem, 46·3 per cent in Vellore, 45·3 per cent in Tiruchirapalli, and 14·2 per cent in Mangalore.

Chillies—First and Final Forecast Report—1954-55—Madras State: The area sown with chillies in the Madras State in 1954-55 is estimated at 1,39,500 acres. Compared with the actual area of 1,37,700 acres for the previous yeear and an average area of 1,25,700 acres calculated for the five years ending with 1953-54, this is an increase of 1·3 per cent and 11·0 per cent respectively. A decrease in area is estimated in the districts of Chingleput, Coimbatore, Tiruchirapalli and Ramanathapuram and an increase in area in the other districts of the State except in South Arcot, North Arcot and the Nilgiris where the area estimated is the same as that of last year. The crop has been harvested or is being harvested in parts of the State. The crop is reported to have been affected by pest in Ramanathapuram district. The condition of the crop is reported to be to be generally satisfactory in the other districts of the state. The yeild per acre is estimated to be normal in Salem, Tiruchirapalli, Tanjore, Tirunelveli and South Kanara districts and slightly below normal in all the other districts of the State.

The seasonal factor for the State as a whole works out to 97% of the normal which is the same as that for the previous year. On this basis, the total yield for the State as a whole works out to 73,900 tons of dry chillies, Compared with the yield of 72,800 tons of dry chillies estimated for first year, this is an increase of 1·5 per cent. Compared with the average yield of 59,200 tons calculated for the previous five years ending with 1953-54, the present estimate is an increase of 24·8 per cent. The average wholesale price of chillies per maund of 82 2/7 lb. or 3,200 tolas as reported from important market centres on 12—3—1955 was Rs. 65—14—0 in Coimbatore, Rs. 61—11—0 in Mangalore, Rs. 52—0—0 in Tiruchirapalli, 51—11—0 in Tuticorin, Rs. 50—15—0 in Madurai, Rs. 49—3—0 in Tirunelveli and Rs. 44—7—0 in Cuddalore. Compared with the prices which prevailed in the corresponding period of last year, these prices show a decrease of 44·9 per cent in Cuddalore, 34·2 per cent in Tirunelveli, 33·8 per cent in Tiruchirapalli, 31·1 per cent in Madurai, 25·4 per cent in Madurai, 25·4 per cent in Tuticorin, 22·8 per cent in Coimbatore and 8·8 per cent in Mangalore.

ERRATA

Madras Agricultural Journal — Market Committees Chronicle for June 1955, page 253, item V of the statement on prices of Arecanut in South Kanara District — please read as "Price per Cwt in Rs." instead of "Price per candy of 700 lb. in Rs.".

Retirements of Some of Our Members from Active Government Service

The following gentlemen have retired from Government service during the year 1954-55. We wish to place on record our sincere thanks to them for all the help they have rendered to the Madras Agricultural Students' Union, either in their official capacity or as functionaries of the Union. We wish them long life, health and happiness during their retired life. We fervently hope and trust that they will continue to evince the same keen interest in the activities of the Union and do all in their power to further the prospects of the Union and the Madras Agricultural Journal.

The Management.

Sri M. Kanthiraj	—	Formerly Dy. Director of Agriculture, Madras, retired as Director of Agriculture and Fisheries, Andhra State.
,, G. V. Narayana	—	Formerly Vice-Principal and Oil Seeds Specialist, Coimbatore, retired as Principal, Agricultural College, Bapatla, Andhra State.
,, C. S. Krishnaswami	—	Retired as Plant Protection Officer (Mycology), Coimbatore.
,, C. Rajasekhara Mudaliar	—	Retired as Systematic Botanist and Professor of Botany, Agricultural College, Coimbatore.
,, S. M. Kalyanaraman	—	Retired as Cotton Specialist, Coimbatore.
,, A. Kunhikoran Nambiar	—	Retired as Millets and Pulses Specialist, Coimbatore.
,, T. S. Ramakrishnan	—	Retired as Government Mycologist, Coimbatore.
,, K. Ramaswami	—	Retired as Superintendent, Central Farm, Coimbatore.
,, K. S. Krishnamurthy	—	Retired as Special District Agricultural Officer, Tanjore.
,, P. K. Natesa Iyer	—	Retired as Farm Manager, Ambalavayil, Wynad.
,, C. V. Sankaranarayanan	—	Retired as Assistant to the Paddy Specialist, Coimbatore.
,, S. V. Doraiswami Iyer	—	Retired as Special Officer, Agro-Economic Research Unit, Madras University.
,, M. Sanyasiraju	—	Formerly Government Agricultural Chemist, Coimbatore, retired as Agricultural Chemist, Bapatla.

Edited and Published by Dr. A. Mariakulandai, M. Sc., Ph. D. (Washington), for the Madras Agricultural Students' Union and printed by A. Subramaniam, at The Coimbatore Co-operative Printing Works, Ltd., Coimbatore.

The Madras Agricultural Journal

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Editorial

Thirty-eighth College Day and Conference: A year of intense activity of the Madras Agricultural Students' Union, culminated with the annual celebrations on the 19th and 20th of August this year.

The College Day and Conference was inaugurated by Shri Ajit Prasad Jain, Union Minister for Food and Agriculture; Sri K. Kamaraja Nadar, Chief Minister of Madras declared open the Exhibition. Sri M. Baktavatsalam, the Madras Minister for Agriculture, Sri M. S. Sivaraman, Director of Agriculture and Sri R. Balasubramaniam, Principal of the Agricultural College delivered introductory speeches on the occasion. The address for the College Day and Conference was delivered by Dr. T. S. Sadasivan, Director, University Botany Laboratory, Madras. There was a large gathering of leading landlords, officials, students, and other non-officials. The address and all the speeches delivered during the occasion have been reproduced in this issue for the information of our readers.

The Symposium on "What next in Agricultural Research and Extension" was conducted in the immediate presence of Sri M. Baktavatsalam, the State Minister, on the 19th and Sri N. Murugesa Mudaliar, Deputy Secretary to the Government on the 20th of August with Dr. T. S. Sadasivan in the chair. Many interesting papers and discussions high lighted the symposium on both the days, in which the Headquarters Deputy Directors of Agriculture, Sri B. M. Lakshmipathi Mudaliar, Dr. K. C. Naik and Sri S. N. Venkataraman and other scientists of the Department, took an active part. The chairman, Dr. T. S. Sadasivan, in his concluding speech

brought out the following points as worthy of attention in the immediate future of Agricultural Science in the State :—

1. The need for the study of the functioning of the root systems of crop plants. Hitherto, much of the emphasis had been directed towards the study of shoot characters in plant breeding programmes. The future, he said, should be directed towards the physiological angle of the breeding to understand the advantages of a shallow or a deep or a wide root system in any programme of selection in plant breeding.

2. Transpirational economy of crop plants, he opined, had to be studied for a proper understanding of drought resistance in plants.

3. New resources of minerals as and when discovered could be secured for plant availability, thus enriching our plant nutrition.

4. He further mentioned that reaction of plants in differing climatic conditions and environment could be tried using meterological methods of measuring root and shoot temperatures with electronic thermocouple units, which are now available in the market.

5. The precursors of long and short staple cotton fibres, it was suggested, may be studied from a bio-physical and bio-chemical angle.

6. A chromosome map of crop plants in Southern India based on the data now available at the Coimbatore Institute and elsewhere, it was pointed out, has to be formulated at a very early date.

7. If plant protection programmes have to be improved, it was agreed, that it will be an urgent necessity to work on phytotoxicity with the Physiologist, the Mycologist, and the Entomologist collaborating to properly screen all properictory products from this aspect, before recommendations are made for crop plants growing under Indian conditions.

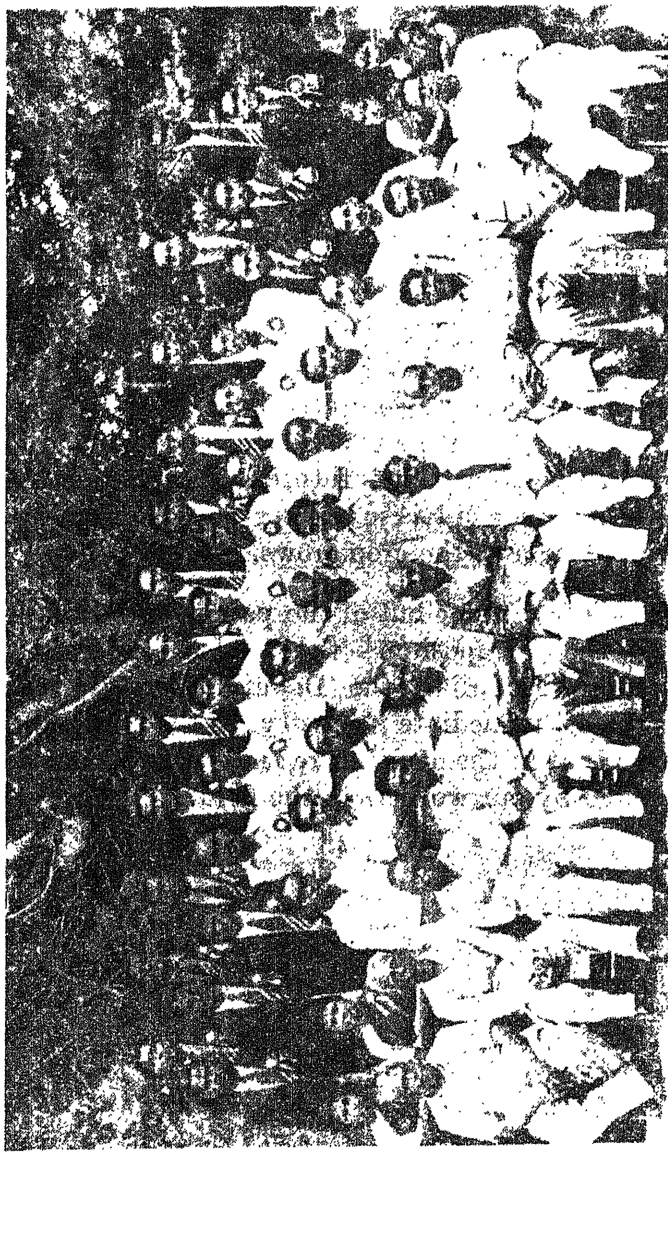
8. The study of Aerobiology, which is a modern approach to the study of air-borne flora and fanna, it was

opined, would have also to be undertaken. The Civil Aviation Department could be approached for permitting the attachment of small aerobiological instruments at Madras, Coimbatore and Cochin on the Eastern and western flanks of the State and at Begumpet, Madras, Trichinopoly, Madurai and Trivandrum on the Northern and Southern flanks of the State for the purposes of this study. This would help prophylactic protective measures to be taken in time on the incidence of crop pests and diseases.

9. Lastly, it was commended, that the establishment of mobile Laboratories operated by expert officers, who will analyse all relevent materials *in situ* was an imperative need. This, it was agreed, would discover in time the possible failure of crops due to improper nutrition. Work so far had been concentrated only on the methods of improving growing conditions of crop plants but future aim, it was stressed, should be to discover adverse causes *in situ* with mobile laboratory vans, even as the crop grows.

These points arising out of the papers and discussions held during the symposium were also endorsed by Sri N. Murugesa Mudaliar, the Deputy Secretary to the Government, as of immediate necessity to the State and we fervently hope that in the near future these aspects of studies would be tackled by our workers in the field.

MADRAS AGRICULTURAL STUDENTS' UNION



Managing Committee and Editorial Board Members, Convenors and Student Volunteers who were in charge of the College Day and Conference.

THIRTY - EIGHTH COLLEGE DAY & CONFERENCE

★

Principal's Welcome Speech

As Principal of the Agricultural College and Research Institute, Coimbatore and President of the Madras Agricultural Students' Union, it is my proud privilege and honour to welcome all those assembled here on the occasion of the thirty-eighth College Day and Conference. The Madras Agricultural Students' Union is very grateful to Hon'ble Sri Ajit Prasad Jain, Union Minister for Food and Agriculture for having consented to deliver the inaugural address and to be present here today at considerable personal inconvenience especially when the Lok Sabha is in session. We feel extremely honoured by the distinguished presence of Hon'ble Sri K. Kamaraja Nadar, our popular Chief Minister who has graciously agreed to open the Exhibition. It is his first visit to the Institution and we are all eagerly looking forward to the opportunity when each specialist will have the privilege of explaining his sectional work with the aid of charts and posters and of benefiting by the advice tendered during the discussions. Let us fervently hope this fleeting visit is only a precursor of further long visits to the research and educational wings of this institution in the near future. We are equally fortunate in securing the presence of Hon'ble Sri M. Bakthavatsalam, Minister for Agriculture, Madras for presiding over the Symposium. His untiring energy, zeal and application to problems of agriculture in the three fields of research, education and extension are well known. He has the rare gift of developing quick personal contacts, understanding the difficulties and applying himself to solve the bottlenecks. The Institution owes a great deal to his personal interest in its present development on the educational side. We can look forward to his able guidance in the conduct of the Symposium "What next in Agricultural Research and Extension Programme", which will have a profound bearing on the execution of the next Second Five Year Plan. It is indeed very kind of Dr. T. S. Sadasivan, Director of Botany Laboratory, Madras University to have accepted the invitation to address the gathering on this occasion. He is a scientist of the first rank and his contributions in the field of mycology and plant pathology have won wide recognition in the scientific world. He is not new to us since he has already delivered the Maharaja of Travancore Curzon Lectures, and the Convocation Address to Diplomates in Horticulture at this Institution. I know him well and on more than one occasion, we have discussed to our mutual advantage certain pathological problems relating to cotton and redgram while I held the post of Cotton Specialist. I am extremely happy to have the privilege of welcoming Dr. Sadasivan, a distinguished scientist whose

words of thought and wisdom will greatly help and cheer us in our deliberations today.

Agricultural education in Madras continued to attract young men in larger numbers than before. The strength of admission to the College which was raised to 108 students during last year was allowed to continue unchanged. 481 applications for admission to the B. Sc. (Ag.) degree course during this year were received. The number is very much larger than those received during the previous years. A considerable proportion of the applications was from farming communities whose desire to give their sons agricultural education at the University level must be viewed as a welcome change likely to have far reaching effects on the pattern of agricultural industry at no distant date. 88 out of 97 students who appeared for the final examination of the degree course under old regulations came out successful. All of them are expected to be absorbed in the existing vacancies of the Department. The six months practical farm training introduced in the syllabus for the final year students under the new regulations was implemented for the current batch from 1st July 1955. The 79 students have been divided into batches and attached to Central Farm, Coimbatore, Agricultural Research Stations, Koilpatti, Aduthurai, Tindivanam, Pattambi and Mangalore on a linguistic basis. Five to six members comprising a team are allotted a quarter acre block of wet or garden land for cultivation from A to Z without engaging outside manual labour of any kind. I am glad to say that the student trainees have entered into the spirit of the work and have proved themselves as efficient and as hardy as the hired professional labour. The members of the Tennessee University and the Indo-American teams of specialists who visited the Institute recently and watched the trainees at field work were extremely appreciative of the system as well as the students' zeal, output and sustained interest.

The Institute continued to attract students for post gradudate research leading to the award of M. Sc., and Ph. D. degrees. During the year 24 students registered for M. Sc., and 4 candidates for Ph. D. degree while one student was awarded the M. Sc., degree. We were compelled to reject a number of applicants for want of students facilities in certain sections.

The Post Graduate Diploma course in Horticulture had to be suspended for the year 1954–55 and revived during the current year with a sanctioned strength of 35 students. The selections have been made and the course has commenced to work from 16th August 1955.

The refresher course in agriculture for young farmers in the age group of 17 to 25 years continued to operate for the third year from 18th July 1955. The training would cover a period of full six months and impart practical instructions in agriculture and allied subjects to

sons of farmers whose scholastic attainments did not go beyond the secondary school stage. The medium of instruction was in Tamil and thirty young farmers from all over the State were selected by the four Regional Deputy Directors of Agriculture and sent to Coimbatore for training under a special Agricultural instructor at the Central Farm. All the previous trainees have gone back to the village and are cultivating their own lands. I wish these young farmers who have returned to their places with added faith, experience and knowledge, a happy future and a long life of continued usefulness to their brother farmers in the neighbourhood.

A notable feature of the year was the arrangement made by the Government in giving short training at private farms to the B. Sc., (Ag.) students who had completed the course and were awaiting the results of their examinations. Most of the Boys took advantage of the offer and spent about a week with selected farmers owning extensive areas and willing to provide free boarding and lodging to student guests. It is hoped that this arrangement will be placed on a permanent footing and the students will have the opportunities to watch and to take lessons from the organisation and management of private farms at close quarters. Let me thank the host Farmers for their gesture and warm welcome extended to the trainees allotted to their care for a brief period.

A new Central Exhibition portraying the problems, the progress of research and the remedies pertaining to agriculture of the State has been organised. Although it is still in the infant stage, it is hoped that in the years to come, it will become a centre of attraction and dissemination of scientific knowledge to the farming population in general. A well equipped adjunct of this type to the Agricultural College and Research Institute will add to the usefulness of research, education and extension wings of the department.

On account of the six months practical farm training instituted for the final year students of revised regulations at five other muffasil Agricultural Research Stations from 1st July 1955, bulk of the students have not been able to participate in the College Day Celebrations and to benefit by the speeches, discussions and displays arranged during the symposium, farmers' day and Central Exhibition. We miss them and their contributions. Let me congratulate the various prize winners of the year and exhort them to display the same zeal and application to the duties and responsibilities allotted to them while in service under the Department. The edition of "Tatler" brought out by the students is in line with the previous traditions of the College. It is an achievement worthy of emulation by the future batches.

The Madras Agricultural Journal continued to convey new messages and ideas to the agriculturists and literate public, largely due to the

sustained spirit of service and liberal donations from the members. It is time that early steps are taken to place the journal on a sound financial footing and to remove all uncertainties about its future.

I once again take this opportunity to extend a very cordial welcome to members of the Public, to student farmers and to officers of all departments assembled here.

Report of the Secretary of the M. A. S. Union

I have great pleasure in presenting to you on behalf of the Madras Agricultural Students' Union, the report for the year 1954—'55.

It is indeed, fortunate that we are having amidst us today Hon'ble Sri A. P. Jain, Union Minister for Food and Agriculture to inaugurate the proceedings of this Conference. I take this opportunity to express the deep sense of gratitude of the Union to Hon'ble Sri Jain for having graciously accepted our invitation, in spite of the multifarious duties that devolve on the responsible position he occupies. We consider it a matter of great pride, Sir, that the increasing importance of conferences of this nature designed to promote the agricultural development of the country has gained recognition by the Government, as evinced by your gracious consent to lead us in our deliberations. Your presence here, today is not only an encouragement to us, but also a pointer to our responsibility in the co-ordination of the work of the scientist for the benefit of the tiller of the soil. Hon'ble Sri Jain will always be remembered as a worthy son of the Nation, a patriot of the front rank, who has sacrificed much in the cause of freedom. He has been closely connected with the abolition of the Zamindari and is now at the helm of affairs in the agricultural development of the Indian Union. The example of Hon'ble Sri Jain in the National cause will always be a reminder to us to forge ahead with our endeavours in the fulfilment of the country's developmental plans and his mature experience can guide us to follow the right path.

It is also our proud privilege to welcome to our midst, our popular Chief Minister, Hon'ble Sri K. Kamaraja Nadar. His sincere interest in the welfare of the tiller of the soil and the common man and his simple and direct methods of solution of the difficult problems that confront our State have endeared him to all classes of people, high and low. This is the first occasion when we are having the honour of his gracious presence in our midst. We are grateful to him for consenting to open the Central Exhibition.

Hon'ble Sri M. Bakthavathsalam, Minister for Agriculture has honoured us by consenting to preside over the Symposium. We owe a debt of gratitude to him for his interest in the activities of the Union.

Hon'ble Sri M. Bakthavathsalam is no stranger to us, as we have had the privilege of his experience in guiding the destinies of our department for the past two years. It is needless to stress the remarkable efficiency with which he guides the activities of the Agricultural Department in the State. We are sure that in his address we would find a rich mine of practical counsel to help us in discharging our duties.

Professor T. Sadasivan, Director, University Botany Laboratories, Madras University, is no stranger to this gathering. He is a scientific worker of international repute. He has represented our country already twice in International science gatherings. He is amongst the foremost workers in the field of Mycology, has trained a number of post graduate students and has gathered round him a group of enthusiastic workers. It is an honour to the Madras Agricultural Students' Union, that he has consented to deliver the presidential address today. We extend him a hearty welcome.

The Madras Agricultural Students' Union: It was in the year 1911 that this Union was founded by a few enthusiastic workers to bring together the associates and students of the Agricultural College, Coimbatore and its predecessor the Saidapet College of Agriculture. The Union has been functioning as an independent voluntary organisation and in those early years served mainly as a link between the students past and present of the Agricultural College in the State. With the widening of interests, it ceased to be a mere students' organisation and has come to be the premier agricultural organisation in the State. It has now in its fold most of the officers of the Department, progressive agriculturists, and students of the College. The Union can claim with legitimate pride to be an organisation which brings into contact both extension and research workers, and the practical agriculturists for exchange of views, dissemination of knowledge, and co-ordination of planning through the medium of its journal and these Annual Conferences.

The Madras Agricultural Journal: The Journal has now come to function as one of the important media for the co-ordination of the results of research and the disemination of knowledge in the development of Agriculture. It is gratifying to record that the popularity of the Journal has been increasing as evinced by numerous contributions from research workers all over India as well as those interested in general agriculture and the articles in the Journal being abstracted in the leading Abstract Journals of the World, like Biological Abstracts, Chemical Abstracts etc. Besides the members of the Union, the subscribers to the Journal include a good many institutions and agricultural research workers in and outside India. In addition, it has on its exchange list a large number of periodicals, both Indian and Foreign.

Market Committees Chronicle: Supplement to the Madras Agricultural Journal: We are proud to place on record that the journal has commenced the publication of a special supplement, the Market Committees Chronicle, which is devoted to the factual record of the activities of Market Committees, in the regulation of agricultural markets, to serve the interests of producers and consumers of agricultural commodities. In spite of the limitation in finance which still continues to be a difficult problem, the Journal has been published regularly every month. We acknowledge with gratitude in this context, the kind help rendered by the State Marketing Officer in the publication of the Market Committees Chronicle.

Finance: Limitations in the financial resources have been the greatest impediment in the expansion of the activities of the Union. The publication of the Madras Agricultural Journal is the chief activity of the Union and even with its modest format, the expenditure under this head continues to be a matter of grave concern and is not commensurate with the income by way of subscriptions. The Indian Council of Agricultural Research was approached for financial aid but it is a matter for regret we were not able to secure the Council's help. State support in the form of a special annual grant of Rs. 1,800/- has been forthcoming since 1947—'48 and for this aid the Union desires to place on record its extreme gratitude to the Government of Madras. To the seven Market Committees in the State who jointly contribute a sum of Rs. 440/- towards the publication of the Market Committees Chronicle our thanks are also due.

We fervently hope that every Research worker in India and every agriculturist in the State will join this organisation as a member and strengthen it, so that it may flourish and play its part creditably in the service of the Nation. We appeal to one and all of our members to help others to join our fold.

The College Day and Conference, 1954: The celebration of the annual College Day and conference is one of the important activities of the Union. The 37th College Day and Conference was celebrated last year from the 18th to 21st August 1954. The conference was inaugurated by Hon'ble Sri M. Bakthavathsalam, Minister for Agriculture, Madras State. Sri N. L. Dutt, Director, Central Sugarcane Breeding Institute, Coimbatore delivered the address and the subsequent sessions were presided over by him.

A symposium on "Recent advances in Agriculture" was organised which aroused considerable interest and a keen discussion in which a number of non-officials as well as departmental officers participated. An account of the proceedings of this Conference has already appeared in the August issue of the Madras Agricultural Journal, 1954.

Meetings under the auspices of the Union: Dr. S. C. Harland F. R. S., Professor of Botany, Manchester University, one of the foremost Geneticists of the world to-day addressed the Officers of the department and the students of the Agricultural College, Coimbatore on the "Impact of Genetics on Plant Breeding".

Ramasastrulu Munagala Prize: The Ramasastrulu Munagala Prize has been awarded for the year 1955 to Sri V. Santhanam, Assistant Cotton Specialist, Agricultural College and Research Institute, Coimbatore for the paper "Studies on the inheritance of some anthocyanin and corolla colour characteristics in Asiatic Cotton" which was adjudged the best by a panel of three judges. Our thanks are due to Dr. S. Krishnamoorthy, Head of the Department of the Agriculture, Annamalai University, Sri T. R. Narayanan, Plant Physiologist and Sri T. Natarajan, Administrative Officer for their kindness in acting as judges for this year's competition.

Patrons: We are extremely happy to report that three gentlemen have become patrons of the Union during the year and the Union has great pleasure in welcoming Sri M. Subba Reddy of Mango Range, Nilgiris, an old student of this College, Sri M. R. Balakrishnan, Retired Agricultural Chemist and present Agricultural Officer, F. A. O., Bangkok and Sri Raja Iyengar, land lord and a leading agriculturist of Madurai, as our new patrons.

Retirements: During the year under report the following members of the Union retired from active Government service. They are Sri M. Kanthiraj, Sri G. V. Narayana, Sri C. S. Krishnaswamy, Sri C. Rajasekhara Mudaliar, Sri S. M. Kalyanaraman, Sri A. Kunhikoran Nambiar, Sri T. S. Ramakrishnan, Sri K. Ramaswamy, Sri K. S. Krishnamoorthy, Sri P. K. Natesa Iyer, Sri S. V. Doraiswamy, Sri M. Sanyasiraju, Sri C. V. Sankaranarayanan and Sri S. S. Kachapeswaran. We wish to place on record our sincere appreciation for the services rendered by Sri G. V. Narayana, Sri C. S. Krishnaswamy, Sri C. Rajasekhara Mudaliar, Sri S. M. Kalyanaraman and Sri S. V. Doraiswamy to the Union as its functionaries. Sri M. Kanthiraj has done a great deal to strengthen the Union, for which we are ever grateful. The others are members of long standing and have helped the Union in various ways for which our thanks are due to them. We wish them all a very happy, peaceful and long life after retirement.

Obituary: We record with deep regret the demise of the following gentlemen who were associated with the Union for a long time. The late Sri Madhava Rajah of Kollengode was a patron of the Union from the early days and evinced keen interest in the activities of the Union. The late Sri C. Tadulinga Mudaliar had been asssociated with the Union from its very early days, as a functionary in various capacities and he retired

from service as the Principal of this College. Late Sri T. V. Rangaswami was a member of the Union for a long time and was one of the foremost research workers in our Department. Late Sri M. P. Kunhikutty was also a long-standing member, who was actively connected with problems of Agricultural Marketing.

Acknowledgements: Now, it is my pleasant duty to express on behalf of the Union, our thanks to all those who have helped the Union in different capacities during the year. We are extremely grateful to Hon'ble Sri M. Bhakthavathsalam for inaugurating the Conference last year. To Sri N. L. Dutt, who delivered the address and presided over the symposium, we tender our heartfelt thanks. To Sri M. S. Sivaraman, Director of Agriculture, Madras, the Committee is grateful for his kind help and guidance in all matters and very kindly distributing the prizes of the sports event last year. To Sri R. Balasubramaniam Principal, Agricultural College and Research Institute, the Union expresses its heartfelt thanks for his valuable help and guidance in making the College Day and Conference of the last year a grand success and for his sincere and sustained interest in all its activities during this year. Our thanks are also due to all the ladies and gentlemen who helped in various ways for the successful conduct of the College Day and Conference in 1954 and during this year.

Speech delivered by Sri M. Bhaktavatsalam, Minister for Food and Agriculture on 19—8—1955 requesting Shri Ajit Prasad Jain, Union Minister for Food and Agriculture to inaugurate the 38th Agricultural College Day and Conference

We are happy to have in our midst today, our distinguished visitor, Sri Ajit Prasad Jain, Union Minister for Agriculture. I must thank him for having so readily accepted my invitation to inaugurate this year's Agricultural College Day and Conference.

We are met here at a time when the country's Second Five Year Plan is taking shape. It is gratifying that under the inspiring leadership of our distinguished visitor and his able colleague, Dr. Punjabrao Deshmukh, the Food and Agriculture Ministry of the Government of India has been taking all steps necessary to see that the Agricultural sector occupies its rightful place in the Plan.

We have accepted in almost all cases the targets of increased agricultural production fixed for this State by the Central Government. These targets are: an increased production of 7·14 lakhs tons of foodgrains, out of which 1·14 lakhs tons are to be obtained by new schemes of irrigation sources and the balance of 6 lakhs

tons are to be obtained by the intensification of various agricultural schemes which are now being implemented such as the use of improved seeds and chemical fertilisers, popularising green manures and compost, reclamation and conservation of lands, control of pests and diseases, etc. and an increased production of 10 lakhs tons of sugarcane, 60,000 tons of sugar, 1,05,000 bales of cotton and 1,40,000 tons of oilseeds. Three hundred tube wells and 3,000 point wells will be sunk during the Plan period and over 2 lakhs seedlings of coconuts and 5 lakhs plants of fruit trees, etc., will be distributed by the end of the Plan period. There are schemes for stepping up appreciably the production of the dollar crops, namely cashew, pepper and areca. Soil conservation schemes will cover nearly 90,000 acres.

Altogether we have included 40 schemes under the head "Agriculture" in our State Plan, the total net cost of which is about Rs. 10 crores. Two schemes to which I draw particular attention on this occasion are: the scheme for strengthening this College and the scheme for upgrading the Research Institute attached to it. I trust that all our schemes will find a place in the final plan and that the Central Government will give us the required financial assistance to enable us to implement them.

We had a Symposium every year during our annual conference on a subject of topical interest. This year the subject "What next in Agricultural Research and Extension" has been chosen very appropriately. The answer to this question is obvious. Agricultural Research and Extension should be geared so as to enable the State to achieve the targets fixed for it in the Second Five Year Plan. However, this is more easily said than done and I trust that the Symposium which will be held to-day will throw practical and useful suggestions for realising this desired end.

Some recent reports relating to the three-year programme of Agricultural Research in this State which I saw recently revealed that while very good work has been accomplished in some fields there was much that was found to be wanting in other directions. I have no doubt that energetic steps will be taken by this Department to level up the work in those deficient fields. The volume and pace of research must be augmented and quickened and set problems should be completed within reasonable time. Research must be purposive, genuine and not repetitive. I realise that research is a slow process but stagnant and inconsequential research is a waste

of time, labour and money. I hope that the research Institute will continue to maintain in the future its fine record of work in the past.

More than research, it is by strengthening our Extension Services that we can ensure the achievement of our targets in the Second Five Year Plan. It is only by a proper organisation of demonstration and propaganda that spectacular results can be achieved as has been revealed by the success all over the country of the improved method of cultivation popularly known as the "Japanese Method". Our State is not lagging behind the other States in the country in Extension work. But, we cannot afford to be complacent in this matter as more work still remains to be done. The ideal I have set before the State Agricultural Department of organising one demonstration plot in each village is yet to be realised and until that is done, we cannot claim to have taken extension to the door-step of the farmer.

The extension work cannot be a success unless there is a two-way traffic a flow of information based on the results of research from the Research Centres to the farmers and a flow in the reverse direction of the needs, suggestions, difficulties and doubts of the farmers to the Research Centres. It is this latter process which is very much wanting and which should be stimulated and developed, and it cannot be done without the constant attention to and intimate contact with the farmers and their problems.

In no country does Extension work seem to have been developed and organized so well as in the U. S. A. It is, therefore, a matter for satisfaction that the Government of India have taken steps under the Indo-American Technical Co-operation Programme to get down experts from that Country who can give us advice in the matter of adopting in our country the features of the American Extension system which are suited to us and can be successfully fitted into our agricultural economy. I met the members of the Tennessee State University Survey Team recently and I had a useful discussion the other day with the American Members of the Joint-Indo-American Agricultural Research and Education Team. I hope that the labours of this joint team will be of practical benefit to teaching, research and extension.

More than anything else, the success of agriculture in the country which has been aptly described as a "Gamble in rains; depends on timely and adequate rains. The seasonal conditions have been fair this year so far and I hope that we would be blessed with favourable seasonal conditions in the coming year also. This

reminds me of the artificial rain-making experiments on which the Madras Government have embarked. We have sent up a scheme to the Government of India and have requested them to give a grant equal to the entire cost as the results of the experiments will be useful not merely to this State but to the country as a whole. In our anxiety not to wait till the Central Government's grant is received, we have sanctioned the scheme on a restricted scale in anticipation of the sanction of the grant.

From the question of seasonal conditions let me turn to the equally important question of stabilising the prices of Agricultural produce. There can be no better incentive to the farmer to go all out and produce all he can to achieve the tragets of agricultural production fixed in the Second Five Year Plan than assuring him a reasonable return for his efforts. The Government of India must be congratulated on the success that has attend so far their efforts to stabilise agricultural prices in the country. But, a durable solution must be found for this recurring problem by undertaking continuous study of production, markets and prices and the speedy implementation of the recommendations contained in the All India Rural Credit Survey. In this connection I must draw attention to the need for placing more emphasis on agricultural economics in our Agricultural Colleges and providing special facilities for study and research. The economic side of Agriculture is very important. Even if the Universities do not devote special attention to it, professional agricultural colleges cannot afford to ignore it. The scientific, technological and economic aspects of Agriculture should be equally developed to make it a prosperous industry. In the technological aspect I include the engineering side which in this country has not yet fully developed and its pace is still slow and halting owing to various reasons. There is need to reduce the cost of production in Agriculture by the adoption of labour saving appliances at various stages and with a greater availability of electrical energy, Agriculture should be revolutionised.

I trust that this College and Research Institute will play its due part in the development of agriculture in this State and will symbolise the spirit of progress. May you students and officers gathered here, be inspired by the words that you will hear from our distinguished guest to greater efforts and nobler achievements.

I have now very great pleasure in requesting Sri Ajit Prasad Jain to inaugurate this College Day and Conference.

Speech of Shri Ajit Prasad Jain, Union Minister for Food and Agriculture, Government of India, inaugurating the Agricultural College Day and Conference at Coimbatore on 19—8—1955

I am thankful to you for having invited me to inaugurate your Thirty-eighth College Day and Conference. Your Union is one of long standing and the Annual day when the old and new students meet together to exchange opinions and experiences has a special significance for your College. It is indeed a great pleasure for me to share your happiness.

Your College is perhaps the oldest Agricultural Institution in the country established as early as 1876 as an adjunct to the Experimental Farm at Saidapet and as a School of Agriculture. It acquired the status of a College in 1878. As early as 1920, the College was affiliated to the University of Madras for B. Sc. Degree in Agriculture and by 1934—'35, it had gained in importance enough to earn recognition for M. Sc. and Ph. D. Degree courses. Thus the College has been one of the pioneer institutions of its type in the country and has rendered valuable services to the cause of agricultural improvement in the State of Madras in particular and the whole of India in general.

Under the patronage of my friend, Shri Kamaraj Nadar, your Chief Minister and a leader of men and the more immediate care of Shri Bhaktavatsalam, your Minister for Agriculture, the Institution has not only expanded in size but has shown an all-round improvement. Both the number of admissions and of students seeking admissions to the College has increased manifold. This is a sign of the growing interest of our young men in the agricultural development. It is gratifying for me to know from the address of your Principal that the bulk of the students of this College are from farming families who are either absorbed in services or take to agriculture on their own account. The need for agricultural personnel is fast growing. Whatever success we have attained under the First Five Year Plan is largely due to a band of devoted workers and under the expanded programme of the Second Five Year Plan, we will need a larger number of Agronomists, Agriculturists and Animal Husbandry Men. I am fully conscious of the need for the qualified personnel and my Ministry has already worked out fairly large-scale schemes for the training of qualified and competent men. I am confident that your College will play an important role in our future developmental programmes in agriculture.

It is gratifying that the students of this College have on the whole made full use of the facilities provided for agricultural training in the syllabus during the final year under the new regulations has been a step in the right direction. Under this scheme, I understand that 5 to 6 students comprising a team are allotted a quarter acre block of wet or garden land for doing agricultural operations without engaging outside manual labour of any kind. This scheme of yours is comparable with a similar scheme that has been worked out in the Uttar Pradesh. Under the Uttar Pradesh Scheme, a student is allotted about 1/20th acre plot for raising crops with his own hands. He is thus not only acquainted with the practical working in agriculture, but during the whole period of his stay at College for three years, he has to do the manual work which inculcates in him the dignity of labour which is unfortunately so much lacking in our educated young men. Produce of the plot after deducting the price of seeds and manure supplied, is given to the student to enable him to earn while he learns. Also some marks are allotted for the work done on the individual plot. What you are doing here and what has been done in the Uttar Pradesh bears comparison and I hope either of the States will benefit from the results achieved by the other.

It is also a good idea that the student should after finishing the course undergo practical training on private farms. I am, however, doubtful if the period of one week is enough for the purpose. It is a matter which deserves consideration whether the students should not be initiated into the all-round activities on the farm so that they may familiarize themselves with the various aspects of the agricultural operations and in the various seasons. This opportunity of stay on the farm may also be utilized for making full acquaintance with the life of the village and of the agricultural practices followed by the small farmer. I have no doubt that with the sound backing of theoretical knowledge and laboratory work, students will be in a position to benefit themselves more effectively by intimate association with the actual practices and living agricultural work.

I attach great importance to the extension work. Fundamental science has its own place in our educational curriculum but it loses much of its utility if it remains confiined to the cloistered walls of our educational institution. It is my firm belief that the educational institutions should serve as radiators of light and knowledge round-about so that the teeming millions engaged in

practical operations may have the opportunity to benefit. Government of India is anxious to re-orientate the system of research and education with a view to bring it in closer and living touch with the agriculturists. With that object in view a team of Indian experts in collaboration with experts from the United States have gone round to study the system of agricultural research education and extension prevailing in the United States. That team is now studying our system of agricultural research education and extension. I am eagerly awaiting the recommendations of the team and I do hope that their report will help us in moulding our system in a manner which may yield practical results.

I am glad to know that you have instituted Refresher Courses in agriculture for young farmers. It is a useful activity. Knowledge of improved and modern methods in agriculture thus acquired will spread through them to their neighbours much quicker and better than through any official agency. I understand this training will be mainly practical and will be given to selected farmers and who are receptive and have the will to learn work. My Ministry has decided to issue instructions to the various Central Institutes and the Commodity Committees as well as States Institutions of agricultural research and education all over the country asking them to hold the Farmers' Day during which 'Progressive and Go Ahead' farmers will assemble at these institutions and learn the various researches that are being conducted, the results available for application and the advantages that acrue from application of modern methods and science. Your College has already anticipated what we propose to do and I am looking forward to the Central and the States' Institutes and Colleges to serve as a source of light, knowledge and inspiration to our cultivators.

In this connection, I have learnt with interest the story of gradual evolution of your Journal from a Year Book in 1911 to a monthly. There can be no two opinions in regard to its utility as a medium for the dissemination of useful agricultural information. With adequate financial assistance, I am sure it will grow in stature and utility. In view, however, of the low literacy among our people, particularly, in the rural area, I think that the Audio-Visual methods of propagation will prove more effective. In the Second Five Year Plan, we hope to develope Audio-Visual Methods intensively.

Before I conclude, I would like you to remember the memorable words of our Prime Minister. He said, " All over India there are

new centres of human activity that are like lamps shreading their light more and more into the surrounding darkness. This light must grow until it covers the land ". India is on the March. We have acquired some experience and confidence on account of the success achieved under the Five Year Plan. Our Second Five Year Plan is going to be a bolder one. There are sceptics who are doubtful about our capacity to raise finances and achieve the targets of the Second Five Year Plan. I have, however, no doubt that the country is determined to make big achievements and I am sure during the next Five Year Plan period, we shall achieve the twin object of increasing our national income by 25 per cent and of creating new employment for one crore of our countrymen. Although in the Second Five Year Plan, there is comparatively more emphasis on heavy industries, yet the allocation for agriculture is going to be much more than what was provided under the First Five Year Plan. Agriculture in India will play a dominant role for a long time to come and any plan or scheme which overlooks the interest of the agricultural sector would be unrealistic in the present context of things. The Second Five Year Plan, however, has given full attention to the manifold aspects of the agricultural development and while there are bigger allocations for schemes under research, minor irrigation work, grow more food, animal husbandry, much heavier allocations have been made in certain new directions like forestry, soil conservation etc.

Ours is a people's plan conceived and worked from below. It depends for its success on the co-operation and the enthusiasm of the people. Fortunately, the mind of the common man is sound. He has the will to go ahead and achieve results. This is the greatest assurance for the success of our Second Five Year Plan. In this great enterprize, you, who have chosen agriculture as your avocation to learn the advances of modern science and their application to the field of cultivation, have a vital role to play. I am hopeful that you will be able to acquaint our farmers with methods by practising which our great heritage, the good earth of this ancient country of sure, may produce more and more for its people.

I wish a happy future to your Union. Let its activities increase and develop. It may not only bring the old and new students together but help in the creation of a bigger family made up of research workers, professors, students and practical farmers inspired with the spirit of mutual help and co-operation.

THE ROLE OF UNIVERSITIES IN THE SPHERE OF FUTURE AGRICULTURAL RESEARCH IN INDIA

College Day and Conference Address by the Chiarman
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Director, University Botany Laboratory, Madras

It gives me immense pleasure in being here to-day and I am deeply grateful for the invitation. My agricultural qualifications entitling me to be here to-day are inconsiderable, as my association with the subject was for about six years as a postgraduate research worker in the premier agricultural institution of the United Kingdom, The Rothamsted Experimental Station and later as Microbiologist at the Punjab Agricultural College, Lyallpur, in undivided India. I am, therefore, not here as one with any great deal of agricultural research experience. I am a University man and since botany is basic to agriculture, I presume I can consider mysely reasonably qualified to indicate the role that we in the Universities, can and ought to assume in the future agricultural development of our country. There is, I think, an urgent necessity of distinguishing between major approaches to problems of agricultural importance. There are, inevitably, both long-range and short-range problems and the Universities can undertake to work on the former and should be encouraged to concentrate on them. At the same time, it is necessary to emphasise that long-range problems do not necessarily indicate purely academic pursuits of fundamental knowledge and, indeed, many applied problems could fall in either category and the Agricultural Departments can undertake such of those for which they are best equipped and pass on the others to University centres of research. For example, the modern work on tissue culture sounds to most people as too 'highbrow' a line of research, but I can well relieve that nothing can be farther from the truth than to style it as purely academic. Who amongst us has not heard of plant hormones? No country can profess to make any spectacular progress in the field of hormones unless they have scientists not only for synthesising hormones but also working on tissue and embryo culture as this is the best known physiological approach for evaluating these useful substances. I am citing this as an example of human ingenuity in trying to imitate nature by cultivating tissues in the laboratory. In fact, techniques for culturing single cells in the laboratory are not for off in this horizon. I can multiply examples but would limit myself to mentioning a most publicised topical subject – the use of radioactive isotopes in

the biological field. Who can predict the course of human destiny and much less that of the plant when in the grip of these powerful sources of energy unleashed by contemporary science ?

I am afraid I have somewhat digressed from the main objecitve I have had in view. But it seemed necessary to indicate the somewhat ill-defined role of Universities in India from the point of view of their research programmes. I have often heard it said that unlike in the Universities the Departments of Agriculture want quick answers to their research problems. I have not been fully able to appreciate this, for, with my limited experience in the biological fields of research, I am inclined to feel that the insistence on this definition of a working programme will not only bar progress but would inevitably lead to a stalemate in research activities. Whilst admitting that research for research sake should not be the sole aim and outlook, it is necessary to concede that any strictly defined programme of research would again hamper progress. We, in the Universities, believe in considerable plasticity in drawing up programmes of research largely because in these days of specialization, it is not infrequently that a researcher feels the need to digress and draw inspiration from border line subjects with which he is not essentially connected and, therefore, in such eventuality he should find himself unfettered. Here, clearly, is an ideological complex where, on the one hand, we have a pattern which allows little latitude in a programme of research and another which, without any rigid proviso, delimits in a way the major line of research but allows of reasonable latitude, I, for one, would commend the latter to the administrator for serious consideration. Admittedly, almost all great discoveries have merged out of free thinking and rigid experimentation. It may sound unorthodox to adopt this pattern straightaway but I make a plea to give it a fair trial and and I am convinced it would change the outlook for the better.

The question foremost in my mind is how Universities can help in building up this integration. In the main they can impart intensive training to Agricultural personnel in basic and semi-applied sciences, particularly in precision techniques. Within the last two decades I have seen a progressive and healthy drift in researches in Indian Universities in tackling border line subjects where the fundamental knowledge they have traditionally acquired has been fitted into applied fields of enquiry. The time is, therefore, ripe in pushing through this training scheme. But before doing so, it would be necessary to finance these projects by establishing suitable

fellowship and financial assistance to cover the cost of special apparatus etc., needed by the fellow during the course of his investigations. This would result in the emergence of a generation of efficient teachers in Agriculture with research experience in fundamental sciences and they would, therefore, be able to embark on their teaching cum research programmes with enthusiasm, efficiency and gusto. It may be necessary, however, to emphasise that such highly trained personnel should solely be employed in posts for which they are eminently suited temperamentally and intellectually and we should cry a halt to "drifts" in science by effectively debarring this category of workers from taking administrative posts. Nevertheless, this brings in its trail the basic question of applying socialistic pattern of employment in service conditions by equating administrative posts with the technical teaching cum research posts. It is probably difficult to agree with the oft quoted views of the late Mr. Bernard Shaw that "those who can, do, and those who can't, teach". I believe it is an anachronism and I would, as a teacher, prefer to put it the other way round and say that "those who can, teach".

It may be worthwhile exploring the possibility of establishing Liaison Officers who will be responsible for co-ordination between Universities and the Departments of Agriculture as this new outlook presupposes free exchange of results between the two. It also becomes incumbent on all those concerned to publish all complete works in recognised national and international Science journals instead of only in memoirs of the Departments of Agriculture of the various States. Governmental subsidy for Science journals of an All-India character and to University Science journals of standing should be stepped up to enable them to publish research manuscripts of mutual interest from the Departments of Agriculture. This would fill a lacuna that has existed for many years and all this would, in my opinion, lead to greater co-ordination between the Universities and the Agricultural Departments.

I have often wondered why in India, unlike in foreign countries, specialists in University centres are not freely consulted by their counter-parts in the Departments of Agriculture and, of course, *vice-versa*. In my view, these watertight compartments, should not be allowed to continue. To some extent the situation could be caused by having panels of scientific consultative committees with specialists from Universities who can also act as reviewing committees of research projects and the working of various sections of the Departments of Agriculture in collaboration with Agricultural

experts. These committees can periodically meet and lend a hand in indicating newer and more fruitful lines of research as they see it. We have to make a beginning somewhere, and I would commend trying this procedure and if such committees objectively view scientific projects without clouding the issues with persons and personalities, we would be harnessing ripe experience and talent in a joint enterprise of the fundamental and applied scientists.

Comparing with our own the lay-out of Agricultural investigations in the West and the liaison they have with their Universities, I cannot refrain from bringing home some of the laudable collaborative work they do. For instance, pilot plant investigations are largely undertaken by the Universities and the results passed on to the Agricultural Research Institutions. Designs of new machinery are usually undertaken as a joint enterprise and what is most fascinating is the extreme delicacy with which precision experimental techniques are evolved from almost rudimentary or even obscure ideas given by individual farmers and growers. There is a moral in every one of those enterprises which will richly benefit us in the advancing scientific consciousness now happily felt throughout our land.

I will finally mention a few words about the Agricultural University at Wageningen in Holland. To my mind the Dutch system of organising Universities for each applied science and basic sciences and the humanities can be studied further. I am somewhat inclined to feel that the formation of an Agricultural University with both graduate and post-graduate teaching and research in all its aspects as in Wageningen would be a matter for serious consideration. In such a University there could be established a system of visiting Professors from the existing Universities for specialised lectures and demonstrations in pure science subjects that have a direct or indirect bearing on Agricultural problems. For instance; bold and imaginative breeding programmes in intergeneric hybridisation, effects of radiations on biological systems, fundamental and applied work on the dynamics of the living plant and many problems of a vital character to a growing Agricultural country could be tackled most vigorously.

I realise I have indulged in some free thinking. Even in Science we have to finesse as much as in a game of cards and if I have placed before you any points of interest worthy of serious thought, I shall return to my laboratory at Madras mightily pleased in having had this honour and opportunity of addressing such a distinguished gathering. Thank you.

Opening of the Exhibition by the Chief Minister, Madras

Introductory Speech of M. S. Sivaraman, I. C. S., Director of Agriculture, Madras

One of the outstanding events of this year in the history of this Agricultural Research Institute has been the separation of the administrative functions from Research Officers in order to enable them to devote whole-hearted attention to scientific and technical matters. This has resulted in centralising the administrative offices in another building; the space released thereby has been pooled together to form the nucleus of a permanent Central Exhibition in which the activities of the Institute are depicted to layman as well as the scientist.

We are acutely conscious of our shortcomings, during a transitional time when Scientists brought up in an atmosphere of English have to make themselves equally intelligible in the vernacular. Some of the posters in the Exhibition may be in English but soon there will be side by side a vernacular rendering which will make the exhibition useful to the average cultivator of the State.

There has been of late a growing tendency to regard agriculture as a very simple subject and an easy profession — a matter of mere sowing of seeds followed by an inevitable harvest, with a few Do's and Don'ts thrown in, in a regimented fashion to ensure success. I hope this exhibition will help to dispel that idea and show that agriculture is at once a very complex and complicated science and art, dealing with a host of factors about which our knowledge vast as it is, is still imperfect. I hope this exhibition will demonstrate that success in agriculture as a profession as in most other walks of life can be obtained only by those who make a serious and whole-hearted attempt to overcome the obstacles in the way. In due course we hope to display in a manner understood by the common ryot the major difficulties they have to face and indicate how our scientific workers are trying to overcome these and with what measure of success.

We are Indeed glad that the inauguration of this exhibition is done in the presence of our Union Minister for Food and Agrirulture and it is now my proud privilege to request our Chief Minister to inaugurate the Central Agricultural Exhibition of the Institute.

Abstract of the Speech by Sri K. Kamaraj Nadar, Chief Minister of Madras, when declaring the Exhibition Open

Recently an impetus had been given for the adoption of new, improved methods in agriculture in the country to increase the output. The benefit had been shared both by the consumer and the ryot.

Considerable research had been done by the Agricultural Department in the matter of evolving new strains and seeds, application of proper manure and combating pests and diseases. An exhibition of this kind would serve to acquaint the public and the ryots with the results of research in all these directions. Our small agriculturists in particular were conservative in taking to new methods and looked askance at them. They would not change unless they were convinced about the utility and efficacy of the new practices. Therefore, to inspire confidence in them was the major problem of research workers and executive officers. An exhibition of this kind would serve as an ocular demonstration of the fruits of research to agriculturists and laymen. If exhibitions of this kind were organised at places where fairs and festivals were held and where people, especially rural folk, congregated, the benefits would be still greater. Besides, it would save poor ryots from the labour and expense of going to the cities and towns like Coimbatore leaving their occupations to witness exhibitions of this kind.

Symposium on "What Next in Agriculture"
List of Papers Received

[N. B. It is proposed to present selected papers as a special symposium number soon]

SUBJECT	NAME
1. *What next in Agricultural Research.	Dr. K. C. Naik.
2. *What next in Agricultural Extension.	Sri S. N. Venkataraman.
3. What next in Agricultural Research with special reference to the breeding method in castor bean production in the Madras State.	Sri K. Thandavarayan.
4. *What next in rice breeding.	Sri K. Ramaswami.
5. What next in Agricultural Research with reference to groundnut cultivation.	Sri N. Srinivasalu.
6. What next in Agricultural extension.	Sri M. J. David.
7. *What next in Agricultural Research and extension programme.	Sri C. Balasubramaniam.

SUBJECT	NAME
8. The need for intense Research on Soil actinomycetes in India.	Sri G. Rangaswami.
9. *What next in Agricultural Research and extension — Entomology.	Sri K. P. Anantha-narayanan.
10. *What next in soil science.	Sri T. Rajagopala Iyengar.
11. *Future of oil seeds Research in Madras State.	Sri C. R. Seshadri.
12. *What next in Banana Research.	Sri T. Gopalan Nair, Sri J. Samuel Sundararaj, and Sri V. S. Seshadri.
13. *What next in Cotton Research and extension in Madras State.	Sri N. Kesava Iyengar, and Sri V. Santhanam.
14. *What next in Agricultural Research and extension — Recent advances and possibilities in Agricultural Research.	Sri T. R. Narayanan.
15. What next in Fruit Research and extension in Madras State.	Sri T. Gopalan Nair.
16. What next in Agricultural Extension programme.	Sri N. Ranganathachari.
17. *What next in fertilisers.	Sri S. Venkatachalam, Sri A. M. Kulandai.
18. *What next in Agricultural Research in Plant Pathology.	Sri M. Kandaswami.
19. *What next in Agricultural Research and extension—Cytogenetics.	Sri N. Krishnaswami and Sri V. S. Raman.
20. *What next in Millets and Pulses Research and Extension in Madras State.	Sri M. Bhavanisankar Rao and Sri B. W. X. Ponnaiya.
21. Some suggestions for intensifying Plant protection work.	Sri S. A. Ebrahim Ali.

* These papers were presented at the conference and discussed.

Prizes awarded during the College Day & Conference

Name of the prizes	Particulars for the award	Name of the prize winners
	Medal Prizes	
1. The Robertson Prize Medal	For obtaining the highest number of marks in Agriculture in the Final Examination of the University in the B. Sc. (Ag.) and qualifing for the degree at the first appearance.	Sri S. Ramachandran (Graduated in 1955)
2. The Clogstoun Prize Medal	For obtaining the highest number of aggregate total marks in all the College Terminal Examinations and passing all the University Examinations at the first appearance.	Sri M. Dinakaran (Graduated in 1955)
3. The Kees Prize Medal	For obtaining the highest number of marks in Chemistry of the Final Examination of B. Sc. (Ag.)	Sri M. Dinakaran (Graduated in 1955)
4. The Dewan Bahadur R. Raghunatha Rao Prize Medal	For obtaining the highest number of marks in Practical Agriculture of both College Terminal and University Final Examinations of the B. Sc. (Ag.)	Sri M. Govindarajan (Graduated in 1955)
5. The D' Silva Memorial Prize Medal	For obtaining the highest number of marks in Animal Hygiene of the University Second Examination of B. Sc. (Ag.)	Sri R. Balakrishnan (Final year B. Sc. (Ag.)
6. The Goschen Prize Medal	For obtaining the highest number of marks in Agricultural Zoology of the University Second Examination of B. Sc. (Ag.)	Sri B. Vasantharaj David (Final year B. Sc. (Ag.)

	Name of the prizes	Particulars for the award	Name of the prize winners
7.	The Anstead Prize Medal	For a student who stands first in Class II in plot cultivation and passing the first and second University Examination at the first attempt.	Sri G. V. Kothandaraman (Final year B. Sc. (Ag.)
8.	The Rao Bahadur K. S. Venkatarama Ayyar Prize Medal	For obtaining the highest number of marks in the aggregate of the First University Examination.	Sri S. R. Sreerangaswami (Graduated in 1955)
9.	The Sampson Agricultural Botany Prize Medal	For obtaining the highest number of marks in Agricultural Botany of the Final University Examination and qualifing for the degree at the first appearance.	Sri M. Dinakaran (Graduated in 1955)
10.	The Dewan Bahadur L. D. Swamikannu Memorial Prize Medal	For obtaining the highest number of marks in the aggregate in all the three examinations of B. Sc. (Ag.) and passing the Annual Examination at the first appearance.	Sri M. Govindarajan (Graduated in 1955)
		Book Prizes	
11.	The M. K. Nambiar Prize Book	For obtaining the highest number of marks at the Second University Examination of B. Sc. (Ag.) at the first appearance.	Sri Diwakar John Frank Chandran (Final year B. Sc. (Ag.)
12.	The Gupta Memorial Prize	For obtaining the highest number of marks in the Agricultural Engineering of the Second Examination of B. Sc. (Ag.) at the first appearance.	Sri Diwakar John Frank Chandran (Final year B. Sc. (Ag.)

1. The guard of honour by the students to the Ministers.
2. Hon'ble Shri Ajit Prasad Jain delivering the Inaugural address.
3. Hon'ble Sri K. Kamaraj Nadar opening the Exhibition.
4. The State Ministers at the Exhibition.

5 & 6. College Day Sports.

—*Snaps by Students' Club Photographic Association.*

NEWS AND NOTES

Indo - American Team :

Dr. Dean R. E., Buchanam, Dr. B. E. Leasure, Dr. A. H. Moseman, Members of the joint Indo-American Team for Agricultural Research and Education accompanied by Sri J. V. Nehmiah of the Indian Council of Agricultural Research Council visited Coimbatore on 11th August 1955 for studying the working of Agricultural education and completed their work by the 13th August.

The Team visited number of institutions including the Agricultural College and Sugarcane Breeding Station. The research work done in these institutions were explained to the members of team.

A meeting was held under the auspices of the Madras Agricultural Students' Union, with Sri R. Balasubramanyam,, Principal in the chair.

Dr. Buchanam addressing the gathering explained the working of agricultural education system in U. S. A.

Sri Balasubramanyam welcoming the team stated that members had come here to study working of agricultural education in India and hoped that on their completion of their tour they would submit a report. He believed that they would have a soft corner for Agricultural institutions when they chalked out programme of aid.

Dr. Buchanam stated Coimbatore Agricultural College resembled his own institute in U. S. A. in many respects though they recognised that nations and their needs differed. Speaker referred to starting of agricultural institutions in U. S. A. about hundred years ago and added very little distinction was made between University and College or Institution. Several farmers in U. S. A. agitated for improved standard of agricultural education since they felt adequate attention was not paid to Agricultural and Industrial education. Each state had its individuality and there was no central government for education. But National or Federal Government gave assistance to agricultural institutions.

Lands were also granted and income from endowments were utilised for agricultural expansion, research and teaching. Most of the states had their thus established agricultural institutions or industrial institutions. Colleges for teaching agriculture were also started with the help of land endowments besides research institutes. It was one of the main objects of the endowments that research workers in agriculture and engineering should be in touch with farmers and understand their needs and requirements. Speaker explained the working of Board of trustees in respect of agricultural education and said that Federal Government used to sanction some special grants also for carrying on certain special research works and for conducting agricultural stations in different states of the country. By agreement various colleges or institutions worked in close co-operation to have uniform standard.

Proceeding, speaker said that only about 25% of agricultural graduates sought Government service while some worked in their own lands and some sought private services in private firms. He was glad that government of India had sent similar team of five agricultural experts to U. S. A. to study working of agricultural education in that country. He hoped these mutual visits would prove useful to U. S. A. and India. India had made astounding developments since Independence and there has been rapid change in this country. Both countries must keep themselves in touch much closer.

Concluding, speaker said that 10% of farmers in U. S. A. were agricultural graduates and added there were many opportunities for agricultural graduates.

Every year 300 firms invited applications from agricultural graduates and engineers. Those employed in private firms got better scales of pay.

First Aid Course:

The inaugural address of the first aid course which was newly started in the Agricultural College, Coimbatore, was delivered by Dr. Ariga, M.B.B.S., with Sri R. Balasubramaniam in the chair on 10—8—1955 Dr. Kuppuswami is conducting the course and Sri U. S. Sreeramulu of class ii is the Secretary of the local Association which is under the auspices of the Agricultural Students' Club. About 150 students are attending the course.

Students Club Elections:

A meeting of the Freshers was held on 1st August 1955 with Dr. A. Mariakulandai in the chair to elect a class representative for the 1st year class. Mr. V. Sivakumar was elected unanimously. At the same meeting Mr. Kothandaraman was elected as the 1st year representative for the Tatler Editorial Board and a volunteer corps was formed from the 1st year students with Mr. K. Khalil Ahmed as the leader. The following were selected as volunteers. Messrs. K. Kothandaraman, Varathan, Krishnan, Alexander Peter, Sivasankaran, Sridharan, Parthasarathy, Jaffer Hussain, David Ponniah and Miss Padmaja.

Tennessee University Team:

Dr. N. D. Peacock, Associate Dean and chairman of Agricultural University of Tennessee and a member of the Indo-American Tennessee Team addressed the members of the students' Club on 3rd August at 5 P.M. in the Freeman Hall. Sri R. Balasubramaniam, Principal, presided over the function.

Social Service:

Milk distribution was started on 15th of August to the children of Poosaripalayam village under the auspices of the Social Service League of the Agricultural students' Club. Inaugurating the milk distribution Mr. Sundaram Iyer, Lecturer in Chemistry, emphasised the importance of social service work.

New Club:

The foundation stone for the new club buildings was laid on 19—8—1955 by Sri M. Bhakthavatsalam; Minister for Agriculture.

Sports:

The Annual College Day Sports was held on the 21st of August. The prizes were given away by Mrs. Diaz, wife of the District Superintendent of Police, Coimbatore. Mr. K. Marappan of Class III won the Championship Cup. The following were the prize winners in the different events:—

1. *Cross country Race:* (5 miles) (The Norris Cup) (36 Minut 10 Sec.)
   (1) Annamalai, P. (2) Thottiappan. (3) Palaniappan, T. A.

2. *Pole Vault:* (8 ft. 8 inch.)
   (1) Sundaram, T. S. (2) Ganapathy, K. M. (3) Chinnappan.

3. *110 Meters Hurdles:* (The Ramaswami Sivan Cup) (18 4/5 Sec.)
   (1) Ramachandran Nambiar. (2) Marappan. (3) Javad Hussain.

4. *Shot Put:* (30 ft. 9¾ Inch.)
   (1) Ramachandran Nambiar. (2) Dharmarathnam. (3) Natarajan, K. R.

5. *100 Meters Dash:* (The Saidapet Old Boys' Cup) (11 1/5 Sec.)
   (1) Marappan. (2) Sundaram, T. S. (3) Ramachandran, C. V.

6. *Long Jump:* (16 ft. 9 Inch.)
   (1) Kochunni Kidav. (2) Ramachandran Nambiar. (3) Natarajan.

7. *Discus Throw:* (93 ft. 11½ Inch.) (New College record.)
   (1) Ramachandran Nambiar. (2) Viswanath. (3) Ratnavelu.

8. *200 Meters Hurdles:* (31 1/5 Sec.) (Naganna Gowd Cup.)
   (1) Marappan. (2) Ramachandran, C. V. (3) Jagadeesan.

9. *High Jump:* (5 ft.) (The Tadulingam Cup.)
   (1) Kochunni Kidav. (2) Ramachandra Nambiar. (3) Jagadeesan.

10. *200 Meters Race:* (25 1/5 Sec.)
   (1) Marappan. (2) Ramachandran, C. V. (3) Thottiappan.

11. *Invitation Race:* (800 Meters) (2 Minutes 9 3/5 Sec.)
   (1) Ramaswamy, K., (Govt. Arts College) (2) Joseph Varkey, (P. S. G. College of Technology) (3) Natchimuthu, Govt. College of Tehnology)

12. *Hop-Step and Jump:* (35 ft. 3½ Inch.)
   (1) Sundaram, T. S. (2) Marappan. (3) Manickavasagam.

13. *Old Boys Competition:*
   (1) Subramaniam, T. L. (2) Varadarajan. (3) Jayaraman.

14. *400 Meters Race:* (The Prince of Wales Cup) (55 1/5 Sec.) (New College Record)
   (1) Marappan. (2) Kochunni Kidav. (3) Subbiah, G.

15 *Javelin Throw:* (143 ft. 1½ Inch) (New College Record)
   (1) Ramachandran Nambiar. (2) Sundaram, T. S. (3) Ramachandran, C. V.

16. *Staff Race for Men:* (100 Yards dash) (12 4/5) Sec.)
   (1) Dr. A. M. Kulandai. (2) Chandy, K. C. (3) Varadarajan, S.

17. *1500 Meters Race:* (The Anstead Cup) (5 mt. 2 3/5 Sec.)
   (1) Kochunni Nair. (2) Annamalai. (3) Thottiappan.

18. *Wamens' Race:* (50 Yards Race.)
   (1) Sivakami. (2) Savithri. (3) Padmaja.

19. *Hammer Throw:* (83 ft. 9½ Inch) New College Record.)
   (1) Ramachandran Nambiar. (2) Dharmaratnam. (3) Viswanath.

20. *Obstacle Race:*
   (1) Perumal Raja. (2) Theetharappan. (3) Ramachandran Nambiar.

Vengayil Krishna Nainar's Cup. Championship Cup. K. Marappan.

Weather Review — For the month of July, 1955.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam)	2·4	— 1·2	17·5
	Tirurkuppam*	4·1	— 0·7	18·4
	Vellore	5·4	+ 0·8	17·1
	Gudiyatham*	3·7	— 1·1	14·0
East Coast	Palur*	5·7	+ 1·2	29·7
	Tindivanam*	3·1	— 0·7	14·6
	Cuddalore	5·2	+ 2·6	27·3
	Nagapattinam	2·4	+ 0 7	17·6
	Aduturai*	1·5	— 0 7	18 0
	Pattukottai*	0·4	— 1·5	9·6
Central	Salem	6·0	+ 2·2	17·6
	Coimbatore (A. M. O.)*	0·7	— 1·1	10·1
	Coimbatore	0·6	— 1·1	12·6
	Tiruchirapalli	1·8	+ 0 7	14·0

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
South	Madurai	3·9	+ 1·9	12·6
	Pamban	0·0	— 0·5	13·7
	Koilpatti*	0·1	— 0·6	9 8
	Palayamcottai	0·0	— 0·3	9 5
	Ambasamudram*	0·2	— 0·6	15·7
West Coast	Trivandrum	3·9	— 3·9	38·9
	Fort Cochin	17·4	— 5·0	94·3
	Pattambi*	9·9	– 15·7	60·5
	Kozhikode	17·3	– 17 0	93·2
	Taliparamba*	24·6	– 22·0	90·0
	Wynaad*	5·6	— 6·0	47·8
	Nileshwar*	41·0	— 6·1	125·4
	Pilicode*	34·2	– 10·1	102·9
	Mangalore	26·1	– 13·3	91·0
	Kankanady*	24·5	– 20·1	91·7
Hills	Kodaikanal	3·7	— 1·0	36·1
	Coonoor*	2·1	— 1·3	19·9
	Ootacamund*	3·9	— 2·8	39·0
	Nanjanad*	3·4	— 7·0	38·7

Note :— * Meteorological Stations of the Madras Agric. Dept.

The low pressure area that lay over Vindhya Pradesh and north Madhya Bharat on 30—6—1955, weakned on 1—7—1955 and broke up over the Punjab-Kumaon Hills on 3—7—1955. A temporary break in the monsoon along the West Coast commenced on 3—7—1955. A low pressure area appeared over east Uttar Pradesh on 6—7—1955. This moved slightly westward persisted over north-east Rajasthan and adjoining Uttar Pradesh for three days and became unimportant on 10—7—1955. The monsoon was generally weak over the entire country on 12—7—1955 but it began to strengthen along the West Coast on 13—7—1955, causing widespread rains, in Malabar—South Kanara. The axis of the monsoon trough lay close to the foot of the Himalayas on 14—7—1955. A shallow trough of low pressure lay over Gangetic West Bengal, Bihar and adjoining Uttar Pradesh on 16—7—1955. This intensified to a depression of small extent over east Uttar Pradesh on 18—7—1955, persisted for two more days and broke up over the Nepal Himalayas on 21—7—1955. A shallow trough of low pressure appeared in the east central Arabian Sea off the Kanara coast on 22—7—1955, which slowly moved northwards and became less marked on 29—7—1955 off Konkan, causing widespread rains in Malabar South Kanara. The axis of the monsoon trough lay close to the foot of the Himalayas from 22—7—1955 upto the end of the month.

The south-west monsoon has so far been below normal throughout the country except in Assam, east Uttar Pradesh and parts of Hyderabad.

The note-worthy rainfalls and the zonal rainfall for the month are furnished below:—

Note-worthy Rainfalls			Zonal Rainfall			
Date	Name of Place	Rain-fall in inches	Name of Zone	Average rainfall for June, 1955	Depar-ture from normal	Remarks
15/7/55	Mercara	2·1	North	3·9	— 0·6	Just below normal
18/7/55	Kallakurichi	4·3	East Coast	3·1	+ 0·3	Just above normal
23/7/55	Pilicode	3·5	Central	2·3	+ 0·2	Just normal
25/7/55	Kozhikode	2·8	South	0·8	nil	Normal
25/7/55	Mangalore	3·3	West Coast	20·5	— 12·0	Far below normal
			Hills	3·3	— 3·0	do.

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 9—8—1955.

C. B. M. & M. V. J.

Departmental Notification

Gazetted Service—Postings and Transfers.

Name and present post	Posted as
Adyanthiah, R. Asst. in Mycology, Coimbatore.	Asst. Mycologist, Coimbatore.
Anantapadmanabha Pillai, R., Spl. D. A. O., Tanjore,	Supdt. C. F., Coimbatore.
Govindaswami, C. V., Crop and P. P. O., Mycology, Coimbatore,	Lect. in Mycology, Coimbatore.
Gopalan Nair, T., Horticulturist and Prof. of Horticulture, Coimbatore,	Banana Res. Officer, Aduthurai.
Kalyanasundaram, N. V., D. A. O., Madurai,	Vice Principal, Grama Sevak Training Centre, Gandhigram.
Krishnan, L., Vice Principal, Grama Sevak Training Centre, Gandhigram,	Asst. Marketing Officer, Trichy.

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Kuppuswami, B. S., Asst. Fruit Specialist, Coonoor,	Asst. Fruit Specialist, Horticulture, Coimbatore.
Ponnaya, J. H. S., D. A. O., Coimbatore,	Block Dev. Officer, Chidambaram.
Ranganathachari, N., Teaching Asst. Coimbatore,	Spl. D. A. O., Crop sampling, Kozhikode.
Samuel Sundararaj, Banana Res. Officer, Aduthurai,	Asst. Fruit Specialist, Coonoor.
Subramaniam, T. V., Asst. in Mycology, Ooty,	Asst. Mycologist, Coimbatore.
Srinivasa Rao, B., Spl. D. A. O., Crop sampling—Kozhikode,	D. A. O., Ootacamund.
Thomas, K. C., Supdt., C. F., Coimbatore,	D. A. O., Madurai.

UPPER SUBORDINATES

Name and present post	Posted as
Arumugam, M., A. D., Peranamallur,	A. D., Madurai.
Alagappan, R. M.,	Asst. in Paddy, Coimbatore.
Achutha Kurup, K.,	Asst. in Fruits, Coonoor.
Abdul Latiff, A.,	Certification Inspector, Rajapalayam.
Andrade Faustine,	Spl. A. D., S. Kanara.
Abdul Kader, J. M. M.,	A. D., Villuppuram.
Arunachalam, V. G.,	Spl. A. D., Com. Project, Lower Bhavani.
Alagirswami, K. R., Block Dev. Officer, Coonoor,	Block Dev. Officer, Pudukottai.
Balasubramaniam, S.,	O. S. Dev. Asst., Cuddalore.
Balasubramaniam, K. R., A. D., Chingleput,	O. S. Dev. Asst., Cuddalore.
Bhaskaran Nambiar, K., A. D., Tudiyalur,	F. M., Tiruvazhamkunnan.
Chinnaswami, M.,	Spl. A. D., Manures, Tanjore.
Chowdappan, S. R., A. D., Uthukuli,	A. D., Sulur.
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Gopalan, N., O. S. Dev. Asst., Trichy,	O. S. Asst., Tindivanam.
Govindarajan, M.,	Fruit Asst., Coonoor.
George, A. J.,	A. D., Chowghat.
Govindan, K.,	A. D., Pernamallur.
Gunachandran, P. N.,	A. D., Madurantakam.
Hariharan, S. V., A. D., Trichengode,	A. D., Sattur.
Indran, M.,	Spl. A. D., Tindivanam.
Iruthaya Raj, M. R.,	Spl. A. D., Manures, Pattukottai.
Krishnan, R. H., Paddy Asst., Aduthurai,	Paddy Asst., Pattukottai.
Kuruvilla, M. J., Spl. A. D., Lower Bhavani,	P. P. S., Tellichery.
Kamalanathan, S., Certification Inspector, Rajapalayam,	Cotton Asst., Coimbatore.
Karuppanan, P. M., A. D., Vilathikulam,	A. D., Nellikuppam.
Karunakara Shetty, B.	O. S., Asst., Nileshwar.
Kathambavana Sundaram, M.,	Potato Asst., Nanjanad.
Krishnamaraj, A.,	A. D., Tiruvannamalai.
Kolandaiappan, K. A.,	A. D., Palacode.
Meenakshisundaram, V.,	A. D., Srivaikundam.
Madhva, O. T.,	Pepper Asst., Cananoor.
Muthiah, M.,	Spl. A. D., Chidambaram.
Muthiah,	A. D., Valavanoor.
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Narayanan, B. L.,	Spl. A. D., Manures, Tanjore.
Natarajan, V. R.,	Spl. A. D., Manures, Tanjore.
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Ramachandran G.,	Spl. A. D., Mannargudi, Tanjore.
Ramaswami P., Spl. A. D., Cotton Palni,	Spl. A. D., Udamalpet.
Ranganathan A. P., [illegible],	Spl. A. D. Chidambaram,
Rajappan P. V., [illegible] Asst., [illegible]	Research Asst., Kallar.
Shanmugam L., A.E.O., [illegible], Koilpatti,	Millet Asst., Coimbatore.
Subramaniam T. N., A. D., Arcot.	A. D., Tudiyalur.
Srinivasan V., A. D., Sattur,	A. D., Karaikudi.
Sivarama Rai P.,	O. S. Asst., Nileshwar.
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Samaraj Daniel,	A. D., Ootangarai.
Kumari Sukanya Bai,	Asst. in Paddy, Coimbatore.
Sriram T. A.,	Asst., Kallar.
Subramaniam,	Paddy Asst., Coimbatore.
Subramaniam,	A. D., Ootacamund.
Sankaran S.,	Millet Asst., Koilpatti.
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Sellanna Goundor V. R.,	A. D. Barugur.
Sasibhushana Menon,	P. A. to D. A. O., Tellichery.
Sankaranarayanan, A. D., Kinathukadavu,	Spl. A. D. Cotton, Coimbatore.
Suryanarayanan S., F. M., Koilpatty,	Do. Do. Palladam
Shanmuga Nainar T. P. Agrl. Eng. Sup., Sattur,	P. A. to D. A. O. Trichy.
Samu Iyer P. V., A. D., Conjeevaram,	Cane Asst., Palur.
Thyagarajan N.,	A. D., Thandaranpet.
Thyagaraj R. S. T.,	Spl. A. D., Cotton, Palladam.
Thulasi Rao N.,	A. D., Thirukoilur.
Thanickachalam T.,	A. D., Ponneri.
Venkatram T. M., A. D., Walajah,	Horticultural Instructor, Coimbatore.
Varadachari T. E., A. D., Villupuram,	A. D., Gingee.
Vasudevan K. V., A. D., Chowghat.	Spl. A. D., Palghat.
Veeraraghavan S. N., Agrl., Instructor, Gandhigram,	Spl. A. D., Melur.
Xavier T.,	A. D., Chingleput.

DONATIONS TO M. A. S. U.

We acknowledge with thanks the sum of Rs. 25/- donated by Sri G. Venkatanarayana, B. Sc. (Ag.), Retired Principal, Agricultural College, Bapatla to the Madras Agricultural Students' Union.

Such donations from our well-wishers would help the Union and are always welcome.

The Management.

DISTRICTS

S. ARCOT; COIMBATORE
MALABAR; S KANARA
RAMANATHAPURAM
TIRUNELVELI
NORTH ARCOT

CROPS

COTTON; GINGELLY
GROUNDNUT
COCONUT
ARECANUT
TOBACCO

Third Conference of Chairmen of Market Committees

The third Conference of Chairmen of Market Committees of this State which was held at Villupuram on the 7th August, 1955 marked the chief event among the activities of Market Committees during the month. The Conference was inaugurated by Sri M. Bhaktavatsalam, Minister for Agriculture. A conference of this kind is held to take stock of the achievements and consider problems of common concern to Market Committees.

In his inaugural address the Minister traced the origin and development of Market Committees which he said had its roots in the recommendations of the Royal Commission on Agriculture more than two decades ago. He reviewed the progress of Marketing Legislation in the several States in India and in this State and explained succinctly the benefits of Regulated Markets. He said that the Act was being slowly but steadily extended and that it has been introduced at present in seven districts in this State in respect of the important commerical crops of the area. He referred in this connection to the opposition created by a section of the trade in the enforcement of the Act through writ petitions in the High Court and Appeal to the Supreme Court. He regretted that even after two decades of passing the Act misconceptions still existed in the minds of the public and explained that the object of the Act is not to interfere with the trade or to control the price or tax the producer. He cited the existence of similar legislation in advanced countries like U. S. A., U. K. etc. and said that it was all the more necessary in a country like India where people were educationally and economically backward. He expressed the hope that a net work of Regulated Markets will be established in all producting centres in

the State and that the day will not be far off when the objects of the Regulated Markets are fully understood by the people. He appealed in conclusion for the co-operation of the people in achieving the objectives of the Marketing Legislation of this State and the implementation of the schemes under Agricultural Marketing that have to be taken under the Second Five Year Plan. At the close of the inaugural session the Minister also opened a small Exhibition on Regulated Markets and their achievements organised by the South Arcot Market Committee for the occasion.

The Conference reassembled in the Afternoon when various problems relating to the working of the Act were discussed at length and resolutions passed.

One of the resolutions recommended the amendment of the relevant section of the Madras Commercial Crops Markets Act and the Election Rules so as to provide for the appointment of Members of Market Committees based on nominations by Government since the present system was cumbersome and costly. By another resolution the Conference recommended an amendment to the Act to provide for the functioning of Market Committees for a continuous period of five years instead of three years at present and also permit the existing Committees to continue pending the amendment to the Act as proposed. One other resolution requested the Government to modify the existing Act as the Madras Agricultural Produce Markets Act so as to apply it to all agricultural produce and extend it to all districts. The Conference urged further that an Expert Committee be appointed to investigate into the working of the Act.

The Chairman, Malabar Market Committee was appointed as convener of the next Conference and at his request it was also decided to have the Conference in Malabar.

Review of Market Conditions for Commercial Crops in the Areas of Market Committees During July 1955

Cotton: (In this Section: Candy 784 lb; Bale 392 lb; Pothi 280 lb.) The Cotton Market at Tirupur started with an opening stock of 9257 candies of Combodia and 2610 candies of Karunganni lint in the month. Arrivals during the month accounted for 8480 candies of Cambodia and 827 candies of Karunganni lint which included 150 candies of lint received from Salem, Tiruchirapalli and Madurai districts. Despatches from Tirupur were of the order of

6238 candies Cambodia and 1944 candies of Karunganni lint of which 1792 candies of lint went outside the notified area to destinations in Travancore-Cochin state, Bombay, Ahmadabad and other districts within the State. The closing stock was 11,199 candies of Cambodia and 2,393 candies of Karunganni lint at the end of the period under review.

The *kapas* market at Tiruppur opened with a stock of 11,723 pothies of Cambodia and 3146 pothis of Karunganni *kapas* as the carry over stock of the previous month. Arrivals during the month amounted to [illegible] pothis of Cambodia and 4,319 pothis of Karunganni *kapas*. Disposals for ginning locally accounted for 21,787 pothis of Cambodia and 4,610 pothis of Karunganni *kapas*. The month end stock was 13,493 pothis of Cambodia and 2,821 pothis of Karunganni *kapas*.

In general the *kapas* market showed larger arrivals than in the previous month since the main kar crop season was at its peak.

At the Kovilpatti market there was an opening stock about 1,600 pothis of Karunganni *kapas* while fresh arrivals from the neighbouring villages accounted for [illegible] pothis. Nearly 2,000 pothis of *kapas* were ginned and sold leaving a balance of about 506 pothis towards the close of the month.

The three markets of Virudhunagar, Sattur and Rajapalayam put together opened with a stock of 650 candies of Karunganni lint at the beginning of the month. Arrivals during the month accounted for 6,095 candies of lint which included 4,030 candies of Karunganni, 2,050 candies of Uganda and 15 candies of Cambodia. After the disposal of 4,800 candies of lint which included 2,735 candies of Karunganni 2,050 candies of Uganda and 15 candies of Cambodia, there remained a closing stock of 1,025 candies of Karunganni lint at the end of the month.

The transactions of *kapas* in the above three markets opened with a carry over stock of 350 pothis of Karunganni *kapas*. Arrivals during the month accounted for 35,890 pothis which included 30,200 pothis of Karunganni 23,400 pothis of Uganda and 200 pothis of Cambodia *kapas*. Disposals during the amounted to 43,800 pothis inclusive of 24,200 pothis Karunganni 19,400 pothis of Uganda and 200 pothis of Karunganni and 4,000 pothis of Uganda *kapas* adding upto 10,350 pothis in all.

Prices (Lint): At Tirupur the price of Cambodia lint was fluctuating between Rs. 857 to Rs. 892—8—0 per candy during the month. The prices of Karunganni lint at the same place were in the range of Rs. 730 to Rs. 785 per candy during the month. At Virudhunagar a steady tone was maintained with prices for different grades and types of Karunganni ruling as given below:

I crop	Rs. 650–686 per candy
II „	616–636 „
Tinny (Karunganni mixture)	590–610 „
Kamuthi Tinny	545–560 „

Prices of Karunganni lint at Koilpatti opened at Rs. 700 per candy for the I quality and Rs. 720/- for the best quality lint and gradually declined to touch Rs. 700/- for best quality and Rs. 780/- for the I quality in the IIIrd week of the month and remained steady thereafterwards. The Uganda lint market at Virudunagar and Rajapalayam opened at rates between Rs. 926–941 per candy for uncertified Cotton and Rs. 1,051–1,086 per candy for the certified lots. After an improvement during the middle of the month the rates closed at Rs. 975–986 for uncertified and Rs. 1,086–1101 for certified quality per candy towards the end of the month.

Kapas: The price of Cambodia *kapas* at Tirupur was seen fluctuating between Rs. 105/- to Rs. 110/- per pothi during the month. Prices of Karunganni *kapas* in the same market maintained a steady tone at Rs. 80–85 per pothi. The prices per pothi at Rajapalayam and Virudhunagar opened at Rs. 70–83 for the I crop and Rs. 51 to Rs. 68—4—0 for the II crop and steadily rose upto Rs. 77 to Rs. 87—8—0 for the I crop and Rs. 63–76 for the II crop in the later weeks but declined at the end of the month to Rs. 70–81 for I crop and Rs. 59–72 for II crop. Prices in Koilpatti opened at Rs. 79/- per pothi for I quality and remained steady during the month. The price for Uganda *kapas* in the above two markets which opened at Rs. 105 to Rs. 129—8—0 per pothi increased to Rs. 122–134 for the I quality and Rs. 107–118 for II quality which ruled firm till the first half of the month. Later the prices declined to Rs. 118–127 for the I quality and Rs. 107–114 for the II quality towards the end of the month.

Cotton Seeds: Prices of Karunganni cotton seed in Virudhunagar market which opened at Rs. 20–21 per pothi of 252 lb.

declined and closed at Rs. 80 to Rs. 19—6—0 per pothi of 252 lb. at the end of the month. Prices of Uganda cotton seed also, which opened in this market at Rs. 15/- per pothi rose upto Rs. 20/- and declined to Rs. 15—8—0 to Rs. 16—8—0 at the end of the month. Prices of Karunganni seed in Koilpatti market per pothi were fluctuating between Rs. 22–24 of 280 lb. during the month.

Groundnuts: (Candy in this section means 531 lb. of kernels and bags in 80 lbs. of pods.) The groundnut markets in South Arcot district opened with a stock of 2587 tons of kernels. Receipts in the eight regulated markets accounted for 7,217 tons of kernels which included 998 tons from places outside the district and 317 tons from outside the State. The quantity crushed by the expellers and rotaries amounted to 6508 tons and by village ghanies to 150 tons. Despatches accounted for 1694 tons and 26 tons respectively to places outside the district and outside the State. A closing stock of 2741 tons was left at the end of the month.

In the principal markets of North Arcot district roughly 1,101 tons of groundnut kernels and 750 tons of groundnut pods arrived during the month. Despatches to places outside the district amounted to 451 tons of kernels. After deduction for crushing purposes etc. there remained a closing stock of 350 tons of kernels at the end of the month.

The average prices of groundnut kernels in the different markets of South Arcot district, ranged from Rs. 95 to Rs. 112 per candy. Tht prices have shown some improvement over these obtaining in the previous month. Prices of kernels in North Arcot district which have ruling around Rs. 95/- rapidly improved to Rs. 115/- to Rs. 120/- per candy in the expectation of an export quota at the middle of the month but ultimately the rates went down and were seen fluctuating in the range of Rs. 150/- to Rs. 107/-. The prices of kernels in Virudhunagar market which opened at the rates of Rs. 95–110 per candy steadily increased to Rs. 112–123 per candy at the end of the month.

Gingelly: (Bag in this Section 168 lb.) The markets of South Arcot district started during the month with an opening stock of 375 bags with which a quantity of 457 bags were added by fresh arrivals. The important market for this commodity is Vridhachalam which alone accounted for a receipt of 332 bags out of the total arrival of 457 bags. One special feature of these

arrivals was that they were from the neighbouring districts. A quantity of 210 bags was cleared by the local crushing industry which includes 2 bags by oil mills and 208 bags by country chekkus. Despatches amounted to 32 bags leaving a closing stock of 726 bags.

The prices during the month gained a little and were ranging from Rs. 42–49 per bag.

Coconut: The four markets in Malabar (Kozhikode, Badagara, Ponnani and Tellicherry) had an opening stock of 6·6 million nuts as carry over stock of the previous month and received 9·2 million nuts during the months. Despatches and local sales accounted for 8·1 million nuts and 0·2 million nuts respectively leaving a closing balance of 7·4 million nuts.

Prices of coconuts in Malabar markets stood in the range of Rs. 95–135 per 1,000 husked nuts. The rates for coconuts in Mangalore market were moving between Rs. 140–165 per thousand for raw nuts and Rs. 165–200 for dry nuts.

Copra: (Candy in this Section 700 lb.) The copra market in Malabar opened with a stock of 2,036 candies. Arrivals during the month amounted to 3,310 candies. Disposals for local sales and despatches outside Malabar accounted for 2158 and 1375 candies respectively. There was a stock of 1813 candies at the close of the month.

Prices of copra showed some improvement during the month. The price ranges as between the different varieties in different markets are extracted below.

(Prices in Rs. per candy of 700 lb.)

	Kozhikode		Badagara	
Varieties	Maximum	Minimum	Maximum	Minimum
Office	340	325	315	305
Edible	365	335	325	320
Rajpur	425	400	420	405
Madras	380	375	370	365

At Mangalore also the prices revealed a slight improvement within the range of Rs. 307–344 per candy (unit of 700 lb.)

Arecanut: The stock of arecanut in Mangalore market opened with a quantity 3,300 cwts. at the beginning of the month and

13,000 cwts. were added to it from fresh arrivals. Exports accounted for 12,713 cwts. leaving a closing stock of 3,587 cwts.

The price of "Supari" which opened at Rs. 158–175 per cwt. improved to Rs. 160–182 at the end of the month. The price ranges of supari in Mangalore are indicated below:

(Prices in Rs. per cwt.)

Varieties	Maximum	Minimum
Magalore Supari	182	158
Malabar ,,	158	150
Choll ,,	185	160
Koka ,,	135	85

The stock of arecanut at Kozhikode and Ponnani opened with a quantity 994 bags of (100 lb. each) and 4,930 bags were received. Disposals amounted to 4,197 bags and 50 bags for despatches and local sales espectively leaving a carry over stock of 1,677 bags.

The prices of arecanuts in the district were ranging from Rs. 144–155 per bag during the month.

Tobacco: (Candy in this Section 500 lbs.) In Coimbatore district, 4,150 candies of chewing variety and 2,715 candies of cheroot variety were despatched outside the district to places in Malabar and Travancore-Cochin State. The month end stocks were estimated to be 14,145 candies of chewing and 7,145 candies cheroot tobacco.

The tobacco market was firm toned up by Rs. 50/- in the case of superior varieties and by Rs. 20 to 30 in the case of other varieties.

The prices ruling as between the different varieties are indicated below:

(Price in Rs. per candy of 500 lb.)

Variety	I grade Rs.	II grade Rs.	III grade Rs.
1. *Chewing tobacco* (Sun cured)			
(a) Meenampalayam	500–550	400–450	250–350
(b) Other varieties	425–450	275–350	200–250
(c) Pit cured (grown in Palladam & Sulur areas)	200–250	160–190	100–140
2. *Cheroot varieties* (Sun cured) grown in Erode and Bhavani taluks	250–300	175–225	120–150

Activities of the Market Committees during the month of July 1955

Of the seven market committiees in the State only five in the districts of North Arcot, South Arcot, Coimbatore, Malabar and South Kanara continued to be actively functioning. The activities of the Committees at Ramanathapuram and Tirunelveli continued to be restrained due to injuction order of the Madras High Court.

The following progress was made by the Market Commitees during the month in the issue of licences under Madras Commercial Crops Market Act.

	Section 5 (1)		Section 5 (3)		Weighman		Broker	
	A	B	A	B	A	B	A	B
North Arcot Market Committee	56	790	9	352	8	287	...	10
South Arcot Market Committee	176	1519	190	1512	238	780	...	3
Tirunelveli Market Committee	...	36	...	15	...	17	...	...
Malabar Market Committee	54	359	113	1083	40	166	...	5
South Kanara Market Committee	5	209	4	175	...	38	...	...

(A—During the month B—Upto month)

The total of transactions in the commercial crops in 13 Regulated Markets in the State during July, 1955 is shown consolidated below:

Crop	Quantity	No. of Regulated Markets
Groundnut kernels	7717 tons	8
Gingelly Seeds	463 bags	5
Cotton lint	1,506 Cdys.	3
,, Kapas	9,390 Pothis	3

(Cdy. 784 lb. Pothi: 280 lb. Bag: 168 lb.)

Meetings: A meeting of the Committee was held by South Arcot Market Committee during the month when two subjects were discussed and disposed of. A meeting of the Malabar Market

Committee was held at the Regulated Market premises at Kuttipuram during the month and eighteen subjects were discussed at the meetings.

Special Feactures: A regulated market of Malabar Market Committee for arecanut was declared open at Kuttipuram by the Minister for Agriculture on 8—7—1955 when Sri A. V. Govinda Menon, Retired District Judge presided. The function was largely attended by growers, traders and other prominent people of Malabar. About 100 lbs. bags of cured arecanut had also been assembled at the market of which the first bag was auctioned by the Minister for Agriculture for Rs. 155/- a cwt. Arrangements are on way for opening another regulated market for Malabar Market Committee at Talakadathur.

Quality Appraisal: South Arcot Market Committee continued its work on the studies on the quality of groundnut kernels marketed in six of its regulated market including Panruti on the basis of random sampling. A total of 683 samples of kernels was drawn from arrivals of 30,247 lots comprising 5306 tons and each lot was analysed for the quality factors. The board details of the analysis comprising determination of dryage and total refractions (compresing of (i) dirt and foreign matter, (ii) nuts in shell, (iii) splits, (iv) damaged, (v) brokens and (iv) shrivelled) are of interest and are given below:

Particulars	Panruti	Cuddalore	Villupuram	Tindivanam	Tirukkoilur	Virdhachalam
1. *Dryage:*						
2% and below	..	31	6	27	18	45
Above 2% and upto 3%	1	17	2	9	..	39
,, 3% ,, 4%	2	30	7	8	28	26
,, 4% ,, 5%	4	10	5	6	..	9
,, 5% ,, 10%	64	55	43	40	92	4
Over 10%	33	13	3	6	..	..
2. Total refraction						
4% and below	30	30	4·14	..	60	123
Above 4% upto 8%	104	104	..	30	67	..
,, 8%	22	22	10·47	66	11	..

As seen above the moisture content in the kernels marketed at Tirukoilur and Panruti seems to be rather high. The quality of groundnut kernel marketed at Vridhachalam appears difinitely superior to others both in point of moisture and total refractions.

Crop and Trade Reports

Sugarcane—First Forecast Report—1955-'56 Madras State: The area under sugarcane in the Madras State upto 25th May 1955 is estimated at 63,150 acres (49,590 acres under planted crop and 13,560 acres under ratoon crop). Compared with the area of 62,000 acres (47,230 acres under planted crop and 14,770 acres under ratoon of crop) estimated for the corresponding period of last year and the average area of 55,660 acres for the previous five years ending 1954'55 the present estimate is an increase of 1·9 percent over that of 1954-'55 and 13·5 percent over that of the quinqunium 1951-55. A decrease in area is estimated in the districts of Salem and Madurai the area estimated is the same as that of last year in the districts of Tirunelveli and Malabar and an increase in other district of the State, except the Nilgiris where the area under the crop is little or negligible. The condition of the crop is reported to be generally satisfactory in all the districts of the State.

The average wholesale price of jaggery in imprortant market centres per maund of 82 2/7 lb. or 3,200 tolas on 18—6—1955 was Rs. 16—3—0 in Mangalore, Rs. 9—11—0 in Coimbatore, Rs. 8—0—0 in Tiruchirapalli, Rs. 7—8—0 in Vellore and Rs. 7—6—0 in Cuddalore. Compared with the prices which prevailed on 19—6—1954, these prices registered a fall of 52·8 percent in Cuddalore, 45·3 percent in Tiruchirapalli, 40·0 percent in Vellore, 17·6 percent in Coimbatore and 15.4 percent in Mangalore.

Bengalgram—1954-'55 Third and Final Forecast Report, Madras State: The area sown with bengalgram in Madras State in the year 1954-55 is estimated at 5,200 acres. Compared with the actual area of 4,320 acres for the previous year and the average area of 4950 acres for the preceding five years, the present estimate shows an increase of 20·4 percent and 5·1 percent respectively. The crop is not grown in the districts of Tanjore, Malabar, South Kanara and the Nilgiris. An increase in area is estimated in the districts of South Arcot, North Arcot, Salem, Coimbatore, Tiruchirapalli, Ramanathapuram and Tirunelveli and a decrease in area in Madurai district.

The crop has been harvested in most of the districts. The seasonal factor for the state as a whole works out to 99 per cent of the normal as against 93 per cent of the normal estimated for the previous year. On this basis the yield is estimated at 1,150 tons. Compared with the estimated yield of 900 tons for the previous year and an average yield of 830 tons for the preceding five years ending with 1953-54, the present estimate shows an increase of 27·8 per cent and 38·6 per cent respectively.

The wholesale prices of bengalgram per standard maund of 82 2/7 lbs. or 3,200 tolas as reported from important market centres on 14—5—1955 were Rs. 10—10—0 at Coimbatore and Rs. 10—13—0 at Salem. Compared with the price of Rs. 18—1—0 which prevailed at Salem in the corresponding period of the previous year, this year's price shows a decrease of 74·6 per cent.

Tobacco—Third and Final Forecast Report—1954-'55—Madaas State: The area sown with tobacco in the Madras State in 1954-55 is estimated at 43,500 acres. Compared with the actual area of 39,200 acres for the previous year and the average area of 43,700 acres calculated for the previous five years ending with 1953-54, the present estimate shows an increase of 11·0 per cent and a decrease of 0·5 per cent respectively. The increase in area this year is due mainly to favourable seasonal conditions. An increase in area is estimated in all the districts of the State except Chingleput, Malabar and the Nilgiris districts where the area under the crop is little or negligible. The crop has been harvested or is

being harvested in parts of the State. The crop is reported to have been affected by aphids in Coimbatore district, The yield per acre is normal in the district of South Kanara and below the normal in all the other districts of the State. The sesonal factor for the State as a whole works out to 92 per cent of the normal for Nicotiana Rustica, 98 per cent of the normal for Virginia variety of Nicotiana Tabacum and 92 per cent of the normal for all other types of Nicotiana Tobacum as against 9,596 and 95 per cent of the normal respectively estimated for the previous year. On this basis, the total yield works out to 24,200 tons of cured leaf as against 22,800 tons of cured leaf estimated for the previous year, representing an increase of 6·1 per cent. Compared with the average yield of 20,400 tons calculated for the five years ending with 1953-54, the present estimate is an increase of 18·6 per cent.

The wholesale price of tobacco per standard maund of 82 2/7 lb. or 3,200 tolas as reported from important market centres on 14—5—1955 was Rs. 41—0—0 in Erode and Rs. 45—8—0 in Tiruppur. Compared with the prices which prevailed on 15—5—1954, these prices reveal an increase of 4·1 per cent in Erode and a decrease of 28·1 per cent in Tiruppur.

Crop-Redgram—Third and Final Forecast—1954-'55—Madras State: The area sown with redgram in Madras State in 1954-55 is estimated at 1,77,100 acres compared with the actual area of 1,74,200 acres in the previous year, it is an increase of 1·7 per cent. Compared with the average area of 1,60,500 acres calculated for the five years ending with 1953-54 it is an increase of 10·3 per cent.

The crop is mainly grown in the districts of South Arcot, North Arcot, Salem, Coimbatore and Tiruchirapalli. The area estimated is the same as that of last year in South Kanara district. An increase in area is estimated in all the districts except in Salem, Coimbatore, Madurai and Ramanathapuram, The area under the crop is nil or negligible in the Nilgiris district.

The crop has been harvested in most of the districts of the State. The yield per acre is estimated to normal in Tanjore and slightly below normal in the other districts of the State. The seasonal factor for the State as a whole works out to 96 per cent of the normal as against 95 per cant for the previous year. On this basis, the total yield works out to 25,300 tons of cleaned gram as against 24,700 tons (cleaned gram) estimated for the previous year and an average of 23,200 tons (cleaned gram) calculated for the five years ending 1953-54, representing an increase of 2·4 per cent and 9·1 per cent respectively.

The wholesale price of Tur dhall per standard maund of 82 2/7 lbs or 3,200 tolas as reported from important market centres on 14—5—1955 was Rs. 18—0—0 in Tirunelveli, Rs. 13—3—0 in Vellore, Rs. 13—10—0 in Salem and Rs. 13—4—0 in Tiruchirapalli. Compared with the prices which prevailed in the corresponding period of last year, the prices reveal a decrease of 30·3 per cent in Tiruchirapalli, 22·7 per cent in Salem and 21·3 per cent in Vellore while the price in Tirunelveli was the same as that of last year.

Crop Forecast—Korra crop—Madras State—1954-'55—Third or Final Report: The area sown with Korra or Tenai (Setaria Italica) in the Madras State in 1954-55 is estimated at 93,400 acres. Compared with the provisional figure of area of 94,900 acres in the previous year according to the Season and Crop Report, the current year's estimate is a decrease of 1·6 per cent. Compared with the average area of 88,900 calculated for the five years ended 1953-54, the present estimate is an increase by 4,500 acres or 5·1 per cent. The corp is not grown in South Kanara district. The area estimated is the same as that of the last year in the district of Chinglepet, Tiruchirapalli, Tanjore, Tirunelveli, Malabar and the Nilgiris. An increase in area is estimated in Ramanathapuram district and a

decrease in all the other districts of the State. The bulk of the crop has been harvested. The yield per acre is estimated to be normal in the districts of South Arcot, Salem and Tanjore and below normal in the other districts of the State. The seasonal factor for the crop (Kharif and Rabi) for the State as a whole works out to 97 per cent of the normal as against 94 per cent in the previous year. On this basis, the total yield works out to 29,600 tons of unhusked grain or 23,700 tons of cleaned grain. Compared with the provisional estimate of 29,200 tons of unhusked grain or 23,400 tons of cleaned grain according to the Season and Crop Report for the previous year, the current years estimate represents an increase of 1·4 per cent. The present estimate reveals an increase of 29·8 per cent as compared with the average production of 22,800 tons of unhusked grain or 18,200 tons of cleaned grain calculated for the five years ended 1953-54.

Crop Forecast—Varagu Crop—Madras State—1954-'55—Third or Final Report: The area sown with varagu crop (Paspalum Scrobiculatum) in the Madras State in 1954-55 is estimated at 8,32,500 acres. Compared with the provisional figure of area of 9,35,500 acres in the previous year according to the Season and Crop Report, the current year's estimate is a decrease of 11·0 per cent. Compared with the average area of 7,10,200 acres calculated for the five years ended 1953-54, the present estimate is an increase of 17 2 per cent. The crop is not grown in South Kanara district. The area estimated is the same as in 1953-54 in the districts of Malabar and the Nilgiris. An increass in area is estimated in the districts of Coimbatore and Tirunelveli and a decrease in the remaining districts of the State.

The bulk of the crop has been harvested. The yield per acre is estimated to be normal in the districts of South Arcot, Salem, Coimbatore, Tiruchirapalli, Tanjore, Tirunelveli and Ramanathapuram and below normal in the other districts of the State.

The seasonal factor for the crop (Kharif and Rabi) for the State as a whole works out to 98 per cent in the previous year. The toal yield works out to 3,55,300 tons of unhusked grain or 2,13,300 tons of cleaned grain. Compared with the provisional estimate of 3,97,100 tons of unhusked grain or 2,38,300 tons of cleaned grain according to the Season and Crop Report for the previous year, the current year's estimate shows a decrease of 10·5 per cent. The present estimate reveals an increase of 39·3 per cent as compared with the average production of 2,55,100 tons of unhusked grain or 1,53,000 tons cleaned grain, calculated for five years ended 1953-54.

Crop Forecast—Samai Crop—Madras State—1954-'55—Third or Final Report: The area sown with Samai (Panicum Miliare) in the Madras State in 1954-55 is estimated at 5,71,800 acres. Compared with the provisional figure of area of 5,81,900 acres in the previous year, the current year's estimate is a decrease of 1·7 per cent. But it shows an increase of 24·4 per cent over the average area of 4,59,500 acres estimated for the five years ended 1953-54.

The area estimated is the same as that of the previous year in the districts of Chingleput, Tanjore, South Kanara and the Nilgiris. An increase in area is estimated in the districts of Coimbatore, Tiruchirapalli, Madurai, Ramanathapuram, Tirunelveli and Malabar and a decrease in the other districts of the State.

The crop has been harvested or is being harvested in most of the districts. The yield per acre is estimated to be normal in the districts of Tiruchirapalli, Tanjore, Tirunelveli and Malabar slightly and below normal in the other districts of the State.

The seasonal factor for the crop (Kharif and Rabi) for the State as a whole works out to 96 per cent of the normal as against 94 per cent in the previous year. On this basis, the total yield works out to 1,06,500 tons of unhusked grain or 58,600 tons of cleaned grain. This yield is the same as that estimated for the previous year but shows an increase of 47·3 per cent over the average production of 72,300 tons of unhusked grain or 39,800 tons in terms of cleaned grain calculated for the five years ended 1953–54.

Gleanings

Coconut Beetle: All coconut growers know of the coconut beetle, the stout-built black insect that damages the palms by boring into the unopened fronds and chewing the juice from the fibrous material. Latest experiments show that this pest can be put down with certain chemicals.

Applying a mixture of 'Chlorodyne' five per cent and sand, or BHC five per cent and sand in equal quantities, at the leaf axils and holes bored by the pest gives good relief. 'Chlorodyne' is more effective than BHC. Palms treated with it remain immune against beetle attack for about three months.

The beetle spends its earlier stages in manure pits. Such breeding grounds should also be treated with BHC or 'Aldrin'. If it is BHC, use one ounce of the 50 per cent wettable powder in a gallon of water, and, if 'Aldrin,' use 40 per cent wettable powder in about 12½ gallons of water, and spray.

A New Spinach: At the Agricultural Research Station at Koilpatti, we have a new spinach (*Talimum triangulare*). It is the Ceylon spinach, recently introduced from Ceylon, and being tried at the various Agricultural Research Stations in Madras State.

From what we have seen of this spinach variety at Koilpatti, it looks as if it is going to have a bright future.

The leaves and stems of Ceylon spinach are delicious when cooked like any of the greens. They are not so gummy as those of the common spinach and hence make a vegetable very pleasing to the palate. The plant's ability to thrive under shade with the minimum care is also responsible for its popularity. This new variety has taken the fancy of many persons who raise kitchen and school gardens, as it forms and ideal shade-loving hedge plant.

Cuttings, about six inches long strike roots within ten days of their plantins and the plants attain a height of two feet in three weeks' time. From then onwards, cuttings once in every three weeks can be taken.

An area of ten cents is being continuously croped with Ceylon spinach under the shade of kapok trees at the Agricultural Research Station, Koilpatti, for the past two years. Cuttings planted on ridges one foot apart with a spacing of nine inches between plants have given a calculated acre-yield of 60,000 pounds of tender leaves and stems fit for cooking every year.

The plant flowers throughout the year, The flowers are small and pink in colour. They open at about 9 a. m. and wither away by 4 p. m. It pleases the eye to see the crop in full bloom at 12 noon

The plant produces tiny black seeds do not germinate and grow unless there is a copious supply of water. Hence, it has no chance of becoming a weed.

The cutting and seeds of this plant can be obtained from the Agricultural Rssearch Station, Koilpatti.

Growth Regulators: These compounds, also known as plant hormones, auxins and growth substances, are capable of producing, in a variety of ways, profound changes in the basic life-processes of plants. Particularly versatile are the phenoxy compounds. These compounds can intensify the colour of fruit, can make the petals stay on flowers longer, can increase the water-retaining power of plants, can make fruits ripen earlier, and can totally check fruit-setting on ornamental trees.

Growth regulators, in general, not only accelerate the respiration of plants, but also increase the activity of their enzymes and cause plants to accumulate the simpler forms of carbohydrates (sugars instead of starches). According to present indications. however, growth regulators do not stimulate photosynthesis.

Naphthaleneacetic acid and 2, 4-D can retard the dropping of fruits from apple and pear trees. The former can also be used to thin out the blossoms of fruit trees to prevent the breaking of branches under excessive load of fruits later on. By using 2, 4-D, pineapple growers can increase their crop yields and accelerate the ripening of the fruit. With Maleic-hydrazide, the growth of grass can be retarded or stopped altogether.

Growth regulators are made use of in many other ways. For example, the methyl and ethyl esters of naphthaline acetic acid can prevent the sprouting of potatoes in storage. 4-chlorophenoxyacetic acid can accelerate the growth of figs and produce fruits without seeds- 2, 4, 5-T, by preventing the buttons from falling of lemons, and can minimize the hazards of fungus attack during storage.

ERRATA

Page 301	Para 2	Line 6	read	Pothies of cambodia instead of candies.
,,	,,	,, 7	,,	Pothies instead of candies.
,,	,,	,, 7	,,	Kapas instead of lint.

The Madras Agricultural Journal

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Editorial

Kwashiorkor — *What it means to South India.* This is a grand word — fit to rank with Excalibur, Hekatompylos, and Kilimanjaro — in its exotic flavour and air of mystery. And no doubt it will be grabbed up by examiners of All-India competitive services, as well as by radio quiz programmes. The word belongs to one of the Gold Coast languages and refers to the physiological state of the first child, when a second is expected. In recent years it has gained a wide currency by usage to denote the manifestations of protein malnutrition, otherwise known as the syndrome of infantile multiple deficiency, — ("Sindrome Policarencial Infantil). Since it is obviously difficult to draw any real distinction between malnutrition and under-nourishment, the word serves to signify the whole concept of inter-relations between under-nourishment in children of the poorer classes, their malnutrition and deficiencies of both calories and nutrients and the various physical and psychological disorders arising therefrom. Our readers will find elsewhere in this issue a review of the recent F. A. O. publication on this subject based upon surveys carried out in Central America. This is a valuable record which is sure to give plenty of material for serious reflection. It needs no mention that all such deficiency disorders arise primarily from poverty and as India is not very much better than Central American countries in regard to poverty and standard of living, the present F. A. O. publication is bound to be extremely helpful to Indian readers as well. In fact, most of the findings reported in this survey could as well have been collected from many parts of India and the suggestions made for prevention of such malnutrition disorders are eminently practical ones, and are as applicable

to Indian conditions as to the Central American States. These include: (1) "increased production of food-stuffs in general, but especially of those rich in protein (milk, eggs, fish or meat and vegetables.) (2) education of the public in nutrition, to bring about a better utilisation of available food resources and to encourage the use of certain protein-rich foods seldom or never eaten and (3) publicize health and hygiene measures, to combat the secondary causes which precipitate or aggravate the symptoms.

It would be seen that in all these, the foundation is in increased production of the right type of foodstuffs. Herein lies the need to assign top priorities to all those programmes that envisage the improvement of pastures, fodder grasses and legumes, in order to improve milk production, as well as to increase both in quantity and quality, the production of protein-rich food crops like the major pulse-crops and groundnut.

It is to be hoped that similar nutritional surveys would be taken up under the auspices of the F. A. O. or even independently, in the different regions of the Indian sub-continent in the not very distant future.

A Note on the Unusual Occurrence of the Mango Leaf-weevil (*Rhynchaenus mangiferae*, Mshll:), at Coimbatore

by

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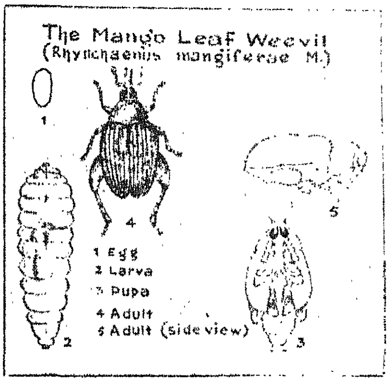
Introduction: Three kinds of weevils are known to cause damage to the leaves of mango in South India. They are *Apoderus tranquebaricus*, F. *Eugnamptus marginatus*, Pasc. and *Rhynchaenus mangiferae*, M. The weevil *Rhynchaenus mangiferae*, M. is the smallest among them and is a leaf miner. It was first recorded in India by Fletcher (1914) as the Mango leaf-boring weevil and was subsequently described by Marshall (1915) as a new species *Rhynchaenus (Orchestes) mangiferae*. It is said to be widely distributed in South India. It is recorded only as a minor pest of mango in South India and since the first description of this weevil, there is no record of its occurrence as a serious pest in any locality in South India. The writers noted this year an unusual appearance of this weevil in large numbers in a pest form at Coimbatore during February and March, 1955, on some of the varieties of mango trees at the orchard attached to the Agricultural College & Research Institute, Coimbatore. Severe damage was caused to the foliage of the trees. The varieties attacked are Malgoa, Ammini and Banganapalle. This is the first time the weevil was noted in such large numbers in a pest form in this locality. The sudden appearence of this weevil in such large numbers offered a good opportunity to make studies on the habits of the weevil and try some of the new chemicals towards its control. Observations made on the above aspects are summarised below :—

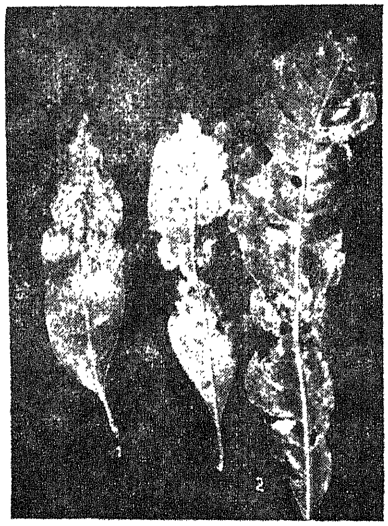
The weevil, its life-history and habits: The adult weevil is a small, pale, reddish-brown beetle measuring about 2 mm. in length, 1 mm. in width, with darker-brown elytra and a short snout. The most characteristic feature of this weevil is the presence of enlarged posterior legs resembling those of flea-beetles. The weevil has a peculiar habit of jumping like flea-beetles and hence it is also known as 'flea weevil'. When occurring in small numbers they can be seen here and there on the young leaves as small, dark

spots, but duriug a serious outbreak the weevils may be seen clustering thickly on the tender leaves at the rate of 20 to 30 on every leaf and when disturbed they jump rapidly in all directions to escape capture. The female weevil excavates a small longitudinal pocket in the leaf tissue and into this she inserts an egg. The eggs are laid generally on the underside of the leaves. The eggs are whitish, elliptical and rounded at both ends measuring on an average 0·45 m. m. in length and 0·24 m. m. in width. The eggs hatch in about three days. The newly hatched grubs are very small, pale yellow in colour with slightly flattened bodies tapering to a blunt point at the hinder end and with small brown heads and jaws especially adapted for their mining habits. On hatching they start mining in between the two leaf surfaces making irregular, twisted galleries, and become full-grown in 4 to 5 days. The full-grown larva is about 2·4 m.m. long, pale yellow with flattened bodies, Pupation takes place inside the leaf itself. Before pupation the full grown larva makes a small, oval pupal cell at the end of larval burrow, lining it with a delicate, loosely-woven brownish cocoon and changes into pupa inside this cocoon. The pupae are small and measure on an average 2·0 mm. in length and 1·1 mm. in width. They are whitish at first, gradually turning brownish before the weevils emerge. The pupal stage lasts for about 3 to 4 days, and the weevils after emerging inside their cocoons bore their way out and start feeding within a short time. The total life-ycle lasts for about 10 to 12 days.

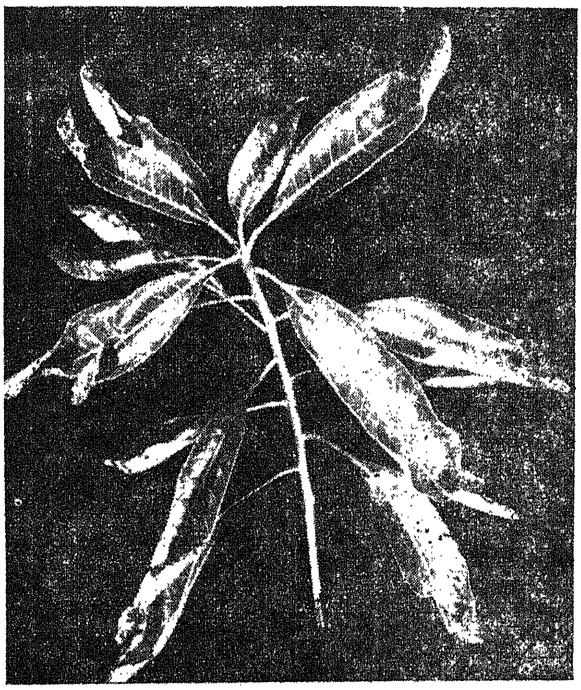
Nature of injury done: The weevil causes damage in adult as well as in its larval stage. The adults feed on the young foliage by eating away small portions of the epidermis and leaf tissues, the injured areas drying up and turning brown so that the leaves sometimes become badly spotted and then curled up or distorted. They usually start feeding at the tip of a leaf and gradually work up towards the stalk sometimes depriving the leaves entirely of all green tissue until these resemble parchment. The larvae mine into the leaves at first, making narrow, irregular, twisted galleries which widen later in blotches. In a minor attack there may be only one or two reddish-brown blotches on a leaf usually near the edge, but during heavy infestation the leaves are almost entirely covered with blotches, a medium-size leaf accomodating up to 20 to 30 larvae. In such cases the whole leaf turns brown and eventually shrivels up. In serious cases considerable damage is done to the foliage of mango trees by this weevil. The drying up of part or



The Weevil and its stages.



1. Leaf showing the damage by the adult weevil.
2. Leaves showing the damage by the grubs.



Mango leaves showing the tips damaged by the adult weevils.

whole of the leaves in affected twigs is so characteristic that a trained eye can spot out an affected tree even from a distance.

Control measures: Fletcher in his notes on the habits of this weevil does not mention control measures. Hutson & Alwis (1934) from their experience in Ceylon says that the weevil occurs in a pest form there and recommend spraying lead arsenate at the rate of 1 oz. to 2 gallons of water on the young leaves as soon as the first indications of an attack are noticed. In cases where the attack has already developed, they suggest removal of all badly mined leaves and burning them to kill all the stages and then spraying the tree to prevent further attack. Since the weevil has not occurred in a pest form in any locality in South India before, there is no information on the control measures adopted for this. Hence some of the new chemicals were tried against this weevil in the recent severe outbreak in the college orchards. DDT 5% plus 50% Sulphur dust, sprays of Lindane and DDT at 0·1% concentrations were tried on selected trees where there was severe infestation. Sprays of both Lindane and DDT were found better than dusts. They had a remarkable effect on the adults, causing 98% kill in 48 hours. The chemicals were also found effective on grubs inside the leaf tissue, causing 50 to 60% kill. Observations after one week of treatment showed that the trees sprayed with these chemicals were completely free from adult weevils. Between the two treatments Lindane and DDT, the latter is to be preferred, as the spraying with DDT now being widely adopted for control of mango hopper, easily destroys this weevil pest also. The cost of spraying a medium-sized tree with DDT worked out only to four annas.

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Crop Rotation Studies on Potatoes

by

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No systematic or definite crop rotation is practised by potato growers on the Nilgiris. In pre-war years, when the area under potatoes was limited, only one potato crop used to be taken from the same land once in three or four years. During wartime, increased demand resulted in soaring prices and an extension of the cultivated area, and it was a common sight to come across the same land growing potatoes every year. The present practice, however, is a two-year rotation, consisting of a crop of potatoes in the first year, followed by a grain crop like *samai*, barley, wheat or *ragi* in the second year.

In the United Kingdom, potatoes are chiefly grown either after a grain crop, usually oats, or alternated with a mixed crop of forage grasses and clovers. In districts growing early potatoes, where suitable soil and other conditions are limited for growing other crops, two or more potato crops are however grown in succession. It is on record that on some fields, potatoes have been successively grown for 30, 40 or even more years. Such intensive cropping is not desirable, since there is always the risk of encouraging serious pests of potato like eelworms and diseases like Powdery Scab or Wart disease.

The practice in America is to grow potatoes followed by corn, barley or lucerne in two-year rotations, but here too, the temptation to grow a money crop like potato, as often as possible, is very great. There have been instances of the same land from which two potato crops had been annually removed for as long and continuous a period as 33 years.

Information on crop rotation studies on potato done in other countries, is mainly limited to investigations on the effects of continuous cropping of potatoes on the incidence of pests and diseases. Melhus, *et al*, (2) had obtained evidence of persistence of Powdery Scab organism in the soil even after a five-year interval between two potato crops. Scab control by a judicious rotation of potato varieties, including the resistant variety, *Jubel*, was recommended by Miss de Bruyn (1), if intensive cultivation of potatoes was necessary. Increasing the rotation between successive potato crops to six or seven years to control Common Scab has been suggested by Whitehead, *et al*, (4).

According to Thomas and Eyre (3), after the potatoes have been grown on the same land for ten to twelve years, it would be advisable to lay the field down to grass for two or three years and to graze it as much as possible thereby ensuring that trace elements, that might have been removed by the potatoes, are replenished. Citing the benefits of growing green manure crops like mustard, rape, ryegrass, clover, lupins and vetches, they have stated that such a practice was healthy, since it led to improvement in the organic matter content of the soil, the utilisation of nitrogen and other soluble plant foods left after lifting of potatoes and prevention of development of weeds. The relative values of the different rotational crops are not, however, specified.

In the absence of any local information available on the benefits of crop rotations for potato, studies were undertaken over a period of six years, commencing from 1942, and the results are reported in this paper.

A total of 17 rotational treatments was adopted to include various cereals and also lupins for green manure. Four different cereals, viz., barley, oats, *Samai* and *Korali* were used. The details of treatments are presented in the accompanying table:

DETAILS OF TREATMENTS.

Treatment symbol	First two-year rotation				Second two-year rotation				Third two-year rotation			
	April 1942	Sept. 1942	April 1943	Sept. 1943	April 1944	Sept. 1944	April 1945	Sept. 1945	April 1946	Sept. 1946	April 1947	Sept. 1947
A	P	P	P	P	Same as 1942 April	,, September	Same as 1943 April	,, September	Same as 1942 and 1944 April	,, September	1943 and 1945 April	,, September
B	P	F	P	F								
C	P	F	S	F								
D	P	F	K	F								
E	P	F	B	F								
F	P	F	O	F								
G	P	L	P	L								
H	P	L	S	F								
I	P	L	K	F								
J	P	L	B	F								
K	P	L	O	F								
L	S	F	P	L								
M	K	F	P	L								
N	B	F	P	L								
O	O	F	P	L								
P	S	F	P	F								
Q	K	F	P	F								
R	B	F	P	F								
S	O	F	P	F								

B = Barley.
F = Fallow.
K = *Korali* (*Setaria pallidifusca*, Stapf and Hubbard)
L = Lupin.
P = Potato.
O = Oats.
S = *Samai* (*Panicum miliare*, Lam.) Little millet.

Each of the three two-year periods, viz., 1942–'43, 1944–'45 and 1945–'46, was taken as a unit of rotation, and the results of the three units examined statistically as a serial experiment, were significant for (1) seasons and (2) treatments, and for all the three interactions, viz., (1) blocks × seasons, (2) blocks × treatments and (3) seasons × treatments, as per the values extracted below:

	Due to	C. D. (P = 0·05) Observed	Calculated
1.	Blocks	21·28	2·27
2.	Seasons	16·51	3·06
3.	Treatments	76·77	1·82
4.	Interaction: Blocks × seasons ..	11·36	2·00
5.	,, : ,, × treatments ..	2·59	1·59
6.	,, : Seasons × ,, ..	3·74	1·59

An extract of the statistical examination of the combined yield values for all the three-year periods of rotation is given below:

Treatments	Acre yield of potatoes in lb.	Percentage of yield on control = 100 (H)
A	32,294	256·1
B	23,861	189·3
C	12,267	97·3
D	12,050	95·6
E	12,061	95·6
F	12,111	96·1
G	27,044	214·5
H	12,606	100·0
I	12,533	99·4
J	14,133	112·1
K	11,050	87·7
L	16,166	128·2
M	16,367	129·0
N	16,061	127·4
O	15,011	119·1
P	15,422	122·3
Q	15,306	121·4
R	15,733	124·8
S	15,944	126·5

Significant.

S. E. = 9·02.

C. D. (P = 0·05) = 1,782.

Conclusion: A, G, B, $\overline{\text{M, L, N, S, R, P, Q, O,}}$ $\underline{\text{J, H, I,}}$ $\overline{\text{C, F, E, D, K.}}$

The conclusions are summarised below:

(1) Growing potato after potato, every year, twice in the same year, gave the maximum total yield, though steady and gradual reduction of yields in the years succeeding the first, and increase of pests and diseases were evident;

(2) Raising a green manure crop of lupins, in the second season (September) every year, maintained the optimum yield of potato, every year, in five out of the six years; it was also noted that raising of the green manure crop, instead of leaving the land fallow after potatoes, resulted in increased potato yields;

(3) While potato following cereals gave reduced yields, raising a green manure crop of lupins after potato (but not after cereals), restored optimum potato yields; and

(4) Of the various cereals tried, oats reduced the yield of the following potato crop to the maximum.

The results of the above crop rotation studies on potato, conducted during the six crop years, 1942—'47, have been summarised from the related Madras Agricultural Station Reports and represent the valuable work done on the subject by the staff of the Agricultural Research Station, Nanjanad, during the period. This is duly acknowledged by the authors in the preparation of this paper.

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Science for the farmer

by

R. M. SAVUR

Any one who wants to progress and improve upon his efforts must develop the habit of considering his actions objectively and critically. Such objective self-criticism is not easy. Knowing what others think of one is a great help. I know, because I have been the object of forthright and downright criticism during the last ten years I have been farming, and the criticism has been adverse without exception.

First, my purchasing a sandy waste-land for my farming venture instead of fertile land was (and, probably still is) considered extremely foolish. Latterly I have been considered crazy because I have taken to cultivating grass as a crop. These people derive confirmation of the correctness of their criticism from the absence of any appreciation of the need for pasture research in our State Agricultural Department.

In 1941, Ware, in an article "The cattle of India and their development" stressed the need for increasing the acreage under fodder crops. Figures given of the area of cultivated land per head of bovine population in India are 1·8 acres as compared with 3·4 acres in Great Britain, 4·5 in New Zealand, 31·4 in Canada and 24·9 in U.S.A. The I. C. A. R. made a belated start in grass research only in 1947. Few States departments have made even a tentative beginning.

The immediate food requirements of the country, no doubt, demand a rapid increase in the production of cereals. For this purpose our governments have taken the right step in encouraging increased outputs with a heavy use of synthetic fertilisers. What the effect of such strong stimulation of cereal crops by synthetic fertilisers will be in the long run upon soil structure and fertility has not been assessed. The experience in other countries of continuous and heavy cereal cropping with artificials has not been very encouraging. Future development in this country should be along lines laid down with a view to the permanence of the whole farming system and not solely from the point of view of immediate production of commodities saleable at the highest price for the time being. We pay far too little attention to soil-building farming systems, with the result that the soil is being destroyed by taking everything off and returning to the land little or nothing that will add to the humus content.

That grass as a crop can be as profitable as any other was realised by European farmers centuries ago. The inclusion of a grass crop in the crop rotation and of livestock to feed on the grass and help in maintaining soil fertility is a common feature of European agriculture. So much so that the E. Bruce Levy, the New Zealand expert, (New Zealand is a country whose agriculture is almost cent percent pastoral) remarks "In my recent trip abroad, perhaps nothing impressed me more than the part the animal played in building up and maintenance of soil fertility in Great Britain and Europe generally" and he adds a remark which is particularly applicable to our country – "stock in large numbers inadequately fed over a long period of time tend to ruin the country".

It was only after the first world war that the U. S. awakened to a realisation of the value of cultivated grass. Since then the awakening has been so thorough that today grass-land farming has become an important part of agriculture in the United States, and farmers keep a larger part of their crop land in grass to be rotated with arable crops, and all grass land is being made more productive by sowing better species and strains, by fertilising and other improved practices while practically all the States are making grassland farming a major part of their agricultural research and extension programmes.

In all under-developed colonial countries in tropical and sub-tropical regions under the control of European nations, especially the English-speaking ones, it has been the aim of agricultural experts to develop some system of alternate husbandry or mixed farming with grass as the pivotal crop for building up and maintaining fertility to ensure a stable income. For many years pasture research has been, and still is being conducted, and much advance has been made in colonies like West Indies, Anglo-Egyptian-Sudan, Nigeria, Gold-Coast, Zanzibar and S. Africa.

The reason for all this pasture research is obvious to those who study agricultural development in foreign countries. Any system, even mono-culture, will pay on very fertile soils but the area of such soils is very limited and is only a small fraction of the total area of cultivable land in any country. The major part consists of land which can be made very productive only if a suitable scientific system of farming is adopted which will provide a good and stable income while providing adequately for building up and maintenance of fertility. Alternate husbandry has been found

to be the best system so far devised for such marginal and sub-marginal lands. Alternate husbandry, however, cannot be adopted everywhere. It can be established only where climatic conditions, mainly humidity and rainfall, are favourable, or in arid and semi-arid regions where irrigation is possible.

This system of farming is entirely suitable for the whole of the coastal area comprising the South Konkan, S. Kanara and Malabar. For the sandy coastal belt this, I believe, will prove the only system which can make the cultivators of the infertile sandy soils as prosperous as the cultivators of the most fertile tracts of other districts. We have here the necessary unfailing rainfall while over much of the area supplemental irrigation is practicable. The temperature practically never goes above 100°F. The two factors which man cannot alter, viz., rainfall and temperature, are favourable for the practice of alternate husbandry. The other factors are within man's control.

There are now manifold forms of alternate husbandry but the essential common feature to all of them is the production of certain crops for human consumption or sale in combination with soil-improving forage crops for animal feeding. The problems are (1) Have we the soil-improving herbage species which will make it remunerative to grow grass as a cultivated crop ?

(2) Have we the animals to be incorporated in the farm enterprise which have the physiological attributes that will make it a paying proposition to feed them with the more nutritious grass or forage crops produced at a greater cost than natural grazing and cereal straws ?

(3) If the answers to both these are in the affirmative the problem still before us will be whether our agriculturists can be persuaded that the introduction of some grass-legume mixture or a soil-improving forage crop is desirable and feasible for the purpose of supplying a source of animal fodder and also for the purpose of improving the structure and therefore the fertility of the soil, both by root action and through the increased amount of animal manure which would be available. The production of more fodder from arable areas might also relieve the strain on grazing grounds which would thereby be given an opportunity to revive.

A Soil Profile Containing Abnormally High Phosphoric Acid

by

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Introduction: During the soil survey of Tanjore district, it was noted that the soil profile taken in the village of Pattiswaran contained an abnormally high amount of phosphoric acid. A detailed investigation was carried out to find out the nature and cause of this unusual phenomenon.

Pattiswaram is situated about three miles south-west of Kumbakonam. A rapid test for phosphoric acid in the surface soils of the village was conducted with the Purdue kit and it was noticed that the soils with high phosphorus content are located round about the hamlet of Injaladi.

Materials and Methods: A profile pit was dug at Injaladi (S. No. 156) to the water table to a depth of about six feet and the soil horizons were studied in the field and samples collected for examination in the laboratory. The details of the soil profile are given at the end. Four surface-soil samples of 0 to 9″ depth were also taken at distance of 200 yards south, west, north and east of the profile pit for analysis in the laboratory. Surface samples selected at random were tested on the spot for phosphoric acid to find out the extent of the area high in phosphoric acid.

Results: The results indicate that the high phosphorus content in the soil is localised round about Injaladi in an area of about 200 acres. The soils of the region are Cauvery alluvium. The results of the analysis of the soils samples from the profile pit given in table I indicate that the phosphorus content is high in the first and second foot with about 50% of the phosphorus in the available form. There is an abrupt change in the third foot, the total and available phosphorus being very low. However, in the fourth and fifth foot of the profile the amount of total and available phosphorus again increases to much higher values than in the top soil. The third foot sample differs to some extent from the others in its mechanical composition and other chemical constituents also.

Examination of the mechanical separates of the profile samples shows that the phosphorus is concentrated in the finer fractions (Table II). The finer fractions contain about three to

TABLE I

Analysis of samples of the profile pit (as percentage on oven-dry basis)

S. No.	Soil sample depth	Loss on igni-tion	In-solubles	Iron and alu-mina	Cal-cium oxide	Magne-sium oxide	K_2O	Total P_2O_5	Avai-lable P_2O_5	Nitro-gen	Organic carbon	pH	Mechanical composition				SiO_2
													Clay	Silt	Fine sand	Coarse sand	R_2O_3 of clay
1.	0—6″	4·23	82·9	9·99	1·07	1·14	0·44	0·241	0·131	0·111	0·837	7·50	26·4	8·8	27·2	38·3	2·79
2.	6–12″	2·98	84·6	9·83	1·26	0·97	0·41	0·248	0·113	0·056	0·315	7·80	26·6	8·8	24·7	41·8	2·95
3.	12–24″	2·89	83·4	10·84	1·16	1·17	0·48	0·360	0·214	0·033	0·243	7·80	28·2	9·7	25·8	37·2	2·84
4.	24–36″	4·77	77·1	15·96	0·90	0·72	0·36	0·065	0·007	0·019	0·099	7·80	42·6	10·8	32·0	10·5	2·34
5.	36–48″	3·05	83·2	10·97	1·56	1·67	0·40	1·024	0·417	0·029	0·205	7·40	27·7	10·3	25·7	36·8	2·90
6.	48–60″	3·48	82·0	8·42	1·45	1·61	0·50	0·801	0·183	0·029	0·206	7·70	28·6	10·6	50·4	11·6	2·69

four times the phosphorus content of the coarser mechanical separates. The phosphorus-bearing material in the coarse fractions was separated by hand-picking and examined. It is greyish in colour and has a conglomerate structure. It is brittle and porous and gives effervescence with dilute hydrochloric acid. The data from chemical analysis of the material is given in table IV. From the chemical composition and from the examination of the material under the petrological microscope, it can be inferred that it is a secondary formation of carboxyapatite deposited over quartz and iron-bearing materials.

TABLE II

Phosphoric acid in the mechanical separates

Mechanical separate	Depth at which the sample was taken					
	0–6″	6–12″	12–24″	24–36″	36–48″	48–60″
Clay	0·584	0·565	0·847	0·142	1·35	0·946
Coarse fractions	0·179	0·203	0·221	0·034	0·379	0·269

TABLE III

Analysis of surface samples from the different corners of the hamlet

S. No.	Sample	Total P_2O_5	Available P_2O_5
1.	South	0·265	0·124
2.	East	0·173	0·017
3.	West	0·240	0·100
4.	North	0·123	0·020

TABLE IV

Analysis of phosphorus-containing material in percentages

1.	Loss on ignition (Co_2)	6·78
2.	Insoluble	54·45
3.	Fe_2O_3	7·94
4.	Al_2O_3	3·42
5.	CaO	12·84
6.	MgO	Traces
7.	P_2O_5	5·93
8.	P_2O_5 expressed as $Ca_3(PO_4)_2$	12·94

Discussion: The investigation reveals that the occurrence of the high amount of phosphorus is localised in about 200 acres of land round about Injaladi. It is not due to the occurrence of any phosphorus-containing minerals. It would appear that it is due to human agencies.

Arrhenius (1920) and Dauncey (1952) have explained the occurrence of high phosphorus content in the soils of certain Swedish farm lands and sites of ancient Roman settlements in England as being due to human settlements. The village of Pattiswaram is situated near the ancient Chola capitals of Kumbakonam and Palaiyur. It may be that the village especially the hamlet of Injaladi was the dumping ground for waste materials of Chola capitals. Since phosphorus is not mobile, it may have got deposited in the locality while the organic matter and nitrogen of the waste materials have been lost by decomposition and leaching. A more probable explanation of the high phosphorus content of the soils is that the site was the burial and cremation grounds of the Chola capitals. The high amount of phosphorus in the first and second foot of the soil may be due to cremation which is generally done on the surface and that in the fourth and fifth feet may be due to the remains of the burial of human bodies.

Summary and Conclusion: The occurrence of a high amount of phosphorus in the soils of Pattiswaram village was investigated. It was found that it is localised in the hamlet of Injaladi. Field survey, soil profile studies and laboratory examination of soil samples suggest that the high phosphorus content of the soils is probably due to human agencies, the site having been used as a burial and cremation ground a long time back.

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APPENDIX

Profile description:

0—5″	Dark bluish grey clay loam, heavily cracked.
6–12″	Dark grey clay loam.
12–24″	Greyish brown clay loam.
24–36″	Brownish silty clay.
36–48″	Greyish brown clay loam moist.
48–60″	Brown clay loam-very moist.
60″	Water table.

The demarcations of the horizons are indistinct.

Groundnut Irrigation Experiment

by

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Introduction: Groundnut, which occupies nearly two million acres in this State is mostly raised as a rainfed crop in drylands. It is also raised as an irrigated crop in the summer season over an area of 1·5 lakhs of acres in the districts of South Arcot, Madurai and Tiruchirapalli. This latter cropping is important in many respects. Firstly the yields obtained are high, being on an average two to three times the yield obtained in the rainfed season. Secondly irrigated produce has about 2 percent more oil and is very valuable in the crushing industry. Thirdly the produce comes to the market in about July–August when the stocks of the earlier crop are almost exhausted and therefore the produce fetches a high price. Consequently the area under irrigated cropping is showing signs of increase. The improved irrigation facilities resulting from various ameliorative schemes have resulted in intensifying the cultivation of summer groundnut.

One notable achievement in this direction is the provision of irrigation from filter points in the wetlands as in Tanjore district, which has stimulated the cultivation of commercial crops in the rice fallows during the off-season. Groundnut and cotton are the only two commercial crops popular with the ryots and selection of a particular crop depends on the soil type. Cotton is exclusively raised in stiff clayey soils while groundnut is favoured in more open-textured soils. Even in this case the spreading type is selected in the loamy soils of the new delta area of Pattukkottai talnk. Irrigation is made cheap and effective from small wells temporarily excavated. In the clayey soils, the short-duration bunch type is preferred on account of its ease of harvest and also because fewer irrigations required. This is a step in the right direction as the production of these commercial crops is increased without encroaching on the area sown to food crops. The rice areas have a commercial crop to enrich the cultivators and the new rotational practice is also a beneficial one.

Nearly 50 percent of the area sown to irrigated groundnut is found in the taluks of Villupuram and Cuddalore in the South Arcot District. The crop is mostly raised in garden lands between

February and July. The crop receives about 12 to 16 irrigations and yields up to 5000 lb. of pods are obtained by judicious manuring with artificials. The number and frequency of irrigations decide the yield as well as the economics of cultivation. Since precise information on these aspects were not available, an experiment was conducted for the purpose and the results are presented in this paper.

Review of literature: At the Agricultural Research Station, Siruguppa (1941–'43) experiments conducted to determine the duty of water for different crops showed that it was 156 acres for groundnut (A. H. 45 – H. G. 1) in black cotton soils. Naturally this figure varies for different tracts as it depends on the soil type, climatic conditions, etc. The most important aspect of irrigation is the economics of cultivation and investigation on this does not appear to have been conducted anywhere.

Materials and methods: The experiment was carried out at the Agricultural Research Station, Palur. The soil of the station is deep, red, sandy loam typical of the area sown to irrigated groundnuts in the district. The following four treatments were adopted :—

(A) Irrigation every 10th day.
(B) Irrigation every 15th day.
(C) Irrigation every 20th day.
(D) Irrigation every 25th day.

The irrigations were given from the day of first flowering which is about 24 or 25 days from sowing. Prior to this, one irrigation was given for sowing and the second, life irrigation was given on the 4th or 5th day. The layout adopted was randomised blocks, replicated six times. A $1\frac{1}{2}$ feet-wide bund separated each plot and the gross plot size was 28′ x 12′ in 1952 and 36′ x 10′ in 1953 while the net plot size was 24′ x 10′ in 1952 and 32′ x 8′ in 1953 after rejecting border rows all round. The irrigations were given as per schedule and they were copious being about 2 acre-inches each time. TMV 4 strain of spreading type of groundnut which is recommended for irrigated cropping in the tract, was selected and sowing done to a spacing of 1′ x 1′. Intercultivation, harvest, etc., were attended to as usual.

Results: The statistical analysis of the yield data and the economics of the treatments were worked out in both the years and the results are presented in the following tables.

TABLE I.

Groundnut—Irrigation Experiment—Yield data.

Treatment	1952 Summer			1953 Summer		
	Acre yield in lb.	Percentage on control	Whether significant or not (P=0·05)	Acre yield in lb.	Percentage on control	Whether significant or not (P=0·05)
(A) Irrigating every 10th day	1843	100·0	Yes	1669	100·0	Yes
(B) Irrigating every 15th day	1725	93·6		946	56·7	
(C) Irrigating every 20th day	1302	70·6		456	27·3	
(D) Irrigating every 25th day	1314	71·3		307	18·4	
Standard error	94·5	5·1		163·7	9·8	
Critical difference	284·0	15·4		493·0	29·5	

Conclusion :— $\overline{\text{A, B,}}$ $\overline{\text{D, C}}$ A, $\underline{\overline{\text{B, C}}}$, D

TABLE II.

Economics of the different treatments.

Treatments	No. of irrigations given	Cost of cultivation Rs.	Acre yield in lb. Pods	Acre yield in lb. Haulms	Gross receipt Rs.	Profit or loss Rs.
			1952 Summer			
A Irrigating every 10th day	15	165	1843	3000	373	208 (Profit)
B ,, ,, 15th day	11	153	1725	2200	349	196 ,,
C ,, ,, 20th day	9	141	1302	1500	263	122 ,,
D ,, ,, 25th day	7	135	1314	1600	266	131 ,,
			1953 Summer			
A Irrigating every 10th day	14	197	1669	3500	424	227 ,,
B ,, ,, 15th day	10	174	946	3400	241	67 ,,
C ,, ,, 20th day	9	164	456	2200	118	46 (Loss)
D ,, ,, 25th day	7	154	307	2000	81	73 ,,

(*Note* :— 1. Cost of irrigating an acre once is taken as Rs. 3/-.
2. Pods valued at 5 lb. per rupee and vines at 500 lb. per rupee during 1952 and 4 lb. for rupee and vines 500 lb. per rupee during 1953 summer).

Discussion: The statistical analyses of the yield data were carried out and the yield differences attained the level of significance in both the years. Highest yield was obtained in both the years in the treatment 'Irrigating every 10th day' and there was progressive decline in yield as the interval increased.

The first year, i. e., 1952 was characterised by favourable distribution of rainfall (7·01" on 19 rainy days) and the temperatures were normal. But in the second year though the rainfall was more, (7·83 inches on 10 rainy days) it was received mostly towards the the latter half of the crop life. The summer was severe and the season was altogether not very congenial for crop growth. This resulted in great reduction in yield as the interval between successive irrigations increased. Treatments (C) and (D) gave only 27·3% and 18·4% of the yield under treatment (A). It is clear that in a normal year there is not much difference between the first two treatments, but in a bad year even irrigating every 15th day has reduced the yields to half, showing the need for frequent irrigations.

The economics of the different treatments reveal that maximum out-turn is obtained by irrigating the crop every 10th day. In the first year irrigating every 15th day was just a little inferior to irrigating every 10th day. This indicates that in years of good summer showers and fairly low day-temperatures and in soils with good capacity for retaining soil moisture or when irrigation costs are high, irrigating every 15th day will be economical.

Summary: In an experiment to determine the optimum intervals for irrigating a summer crop of spreading groundnut, irrigating every 10th day after first flowering gave the highest yield as well as net return. This interval can be extended to 15 days in a year of good summer rains and in retentive soils but in adverse season this treatment will result in low yields and uneconomic returns.

Acknowledgement: Our thanks are due to the Superintendent, Agricultural Research Station, Palur for affording facilities for carrying out the experiment.

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Proliferation in the panicles of *S. nitidum*, Pers.

In a culture of *S. nitidum* Pers., a species belonging to Para-Sorghum, collected from Maruthamalai hills near Coimbatore, it was found that though a large number of panicles was formed and there was normal exsertion of anthers and stigma, no seeds were set. The glumes turned black on maturity as in many wild sorghums and the spikelet was fairly hard. When these were collected and sown no seedlings were obtained. During the present year (1955) with the onset of S. West monsoon there were continuous drizzles and the atmosphere was very humid. Two panicles which had been produced late in January 1955 were still on the plant and it was observed that foliar growths resembling seedlings appeared from the spikelets (Figs. 1 a & b). These on teasing out showed normal glumes, lemma and palets but in the place of seeds foliar growth had taken place. There was no root development though three to four leaves had been produced. However, when the proliferated spikelets were separated and placed in water, roots began developing but all these were adventitious (Figs. 2 a & b).

Similar foliation of spikelets have been recorded in maize, sorghum, ragi and other Gramineae. In sorghum the roots have been found to be produced even when the plantlets are enclosed in the glumes and still on the panicles. In *E. coracana* it is known to be gene-conditioned. In all these cases where such proliferated seedlings have been grown to maturity no panicles appeared but the foliation was repeated and it was possible to maintain this mutant from year to year by this vegetative multiplication. The present observation is interesting in that the parent plant, a 10-chromosomed Para-sorghum, exhibits parallel variation with the Eu-sorghum and is a first record of its kind in this sub-section of Sorghum. It is possible that this free-seeding species growing at an altitude of 3,500 ft. above m. s. l. and is probably self-sterile, may have been induced to this proliferation owing to lack of facilities for production of viable seed. The rooted proliferations have been planted into soil for further studies.

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Proliferation in ***S. nitidum***

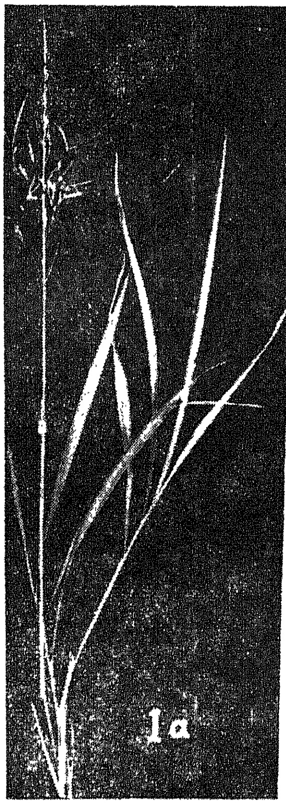

Fig. 1-a. Branch bearing the proliferated panicle, x 1/5 nat. size.

Fig. 1-b. Panicle enlarged showing seedling-like growths. x 3/5 nat. size.

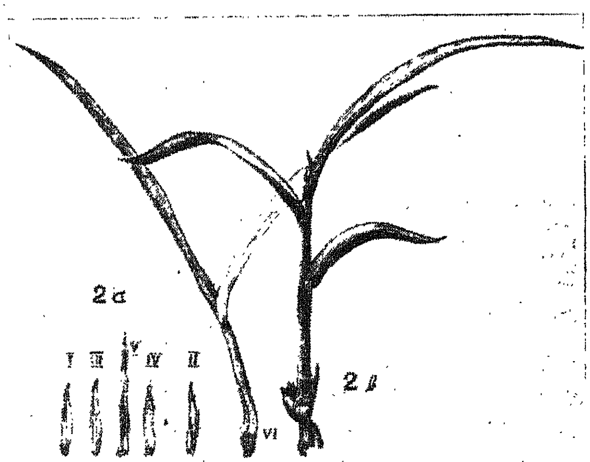

Fig. 2-a. Spikelet teased out x 2.
Fig. 2-b. Showing root growth in the proliferation. x 2.

A Note on the Control of the Housefly in Farmyards

Besides being notorious as a common carrier of organisms responsible for dreadful diseases and epidemics in man, the housefly is also a pest of importance in farmyards. It causes considerable annoyance to cattle by alighting on their bodies. Further, it falls into milk at milking time and pollutes it.

Ramakrishna Ayyar (1940) has recorded *Musca nebula* F and *Musca pattoni* A as the two species commonly noted in South India. They breed mainly on cattle-dung, horse-dung and nightsoil. Many entomologists have worked on the problem of controlling this pest. Ramakrishna Ayyar (loc. cit) recommends the use of fly traps and maggot traps for its control. Acharya *et al* (1945) found earth dung plastering and tarred cloth covering of 'katchra' layer over night soil to be effective anaerobic treatments. Fenton *et al* (1936) recommends a liberal treatment of manure with borax powder. Lal *et al* (1950) also found fly emergence very much less in compost treated with borax. Experiments were conducted at Coimbatore during the past few years for controlling this pest in farmyards by the use of insecticides like DDT and BHC. These insecticides were tried both against the adults and by application to the breeding medium to serve as deterrents and larvicides. The results obtained are summarised below.

(a) *Control of adult flies:* BHC and DDT were tried as sprays against a heavy infestation of flies in a farm building near Coimbatore. The insecticides were sprayed inside spacious halls of 24' x 14' x 11 feet which were heavily infested by flies. Large numbers of dead flies were collected within two hours after spraying BHC. Counts of dead flies were recorded daily till the rate of mortality reached its lowest ebb, The total number of dead flies noted under each treatment is recorded below.

(Treated on 2—9—1949. Counts taken till 14—9—1949).

Number of dead flies collected from sprayed rooms:

BHC (0·1%)	BHC (0·05%)	DDT (0·1%)	DDT (0·05%)
25,003	15,695	10,149	1,377

For the first two days after treatment, no mortality was observed under DDT while as much as 13,450 and 12,125 dead flies were noted under BHC 0·1% and BHC 0·05% respectively. BHC caused a much higher and quicker mortality than DDT.

(b) *Insecticides as deterrents to prevent oviposition:* Heaps of cowdung in blocks of $1\frac{1}{2}' \times 1' \times 4''$ were treated with BHC and DDT. The local practice of covering manure with tank silt was also tried. Fresh dung was heaped over the blocks for three more days, each time treating the dung with the insecticides. On the fifth day, the blocks were caged and the number of flies emerging from the dung heaps was recorded until emergence was completed. The data gathered from five trials conducted are recorded below.

Number of flies emerging from different treatments.

Treatments	I Sep. 1949	II October 1949	III January 1950	IV March 1950	V April 1950
1. DDT 5% dust	491	222	18	94	263
2. DDT 0·1% spray	22	226	26	47	37
3. BHC 5% dust	27	nil	1	nil	46
4. BHC 0·1% spray	nil	nil	nil	nil	nil
5. Tank silt covering	481	322	170	381	Not included
6. Control	136	210	52	37	221

BHC 0·1% spraying proved to be the best treatment, the next in merit being BHC 5% dust.

With a view to fixing the optimum dosage of BHC required for effective control, further tests were conducted in one-foot high earthen pots filled with cowdung free from oviposition. Borax reported to be effective was also tried. The concentration of BHC was brought down to 0·05%. Dosages of 2 oz. of the dust and one gallon of the spray per square yard surface were tried first. The population of maggots and pupae in the different pots was counted after one week of treatment. The data gathered are furnished below.

Treated on 17—1—1953.

Population in treated dung (total of four replications for each treatment).

BHC 5% dust 2 oz. per sq. yard	BHC 0·05% 1 gallon per sq. yard	Borax dust 2 oz. per sq. yard	Borax spray 1 lb. in 13 gallons (1 gallon per sq. yard)	Control
4	nil	16	4	138

Subsequently, BHC alone as dust at 2 oz. per square yard and as 0·05% spray at ½ and ¼ gallon per square yard was tried. The data gathered are as below:

Treated on 31—1—1953.

Population of maggots in treated dung (total of four replications in each treatment).

BHC 0·05% ½ gallon per square yard	BHC 0·05% ¼ gallon per square yard	BHC 5% 2 oz. per square yard	Control
nil	nil	2	56

Thus even a low dosage of BHC 0·05% spray at ¼ gallon per square yard proved to be effective in checking the flies.

(c) *Treating against maggots present in breeding medium:* A definite number of maggots was introduced in earthen pots filled with cowdung and BHC as dust and spray was applied later on the dung surface, after the maggots had penetrated into the dung. The number of flies emerging from the dung was recorded and the figures gathered below show the superior larvicidal efficacy of BHC 0·05% even at ¼ gallon per square yard.

Treated on 31—1—1953.

(No. of maggots introduced in each replication: 50. Replications 4.)

No. of flies emerging from different treatments (total of four replications for each treatment).

BHC 5% 2 oz. per square yard	BHC 0·05% ½ gallon per square yard	BHC 0·05% ¼ gallon per square yard	Control
4	nil	nil	54

Conclusion: BHC 0·05% at ¼ gallon per square yard proved to be quite effective for preventing oviposition and as a larvicide in the breeding medium. The cost of treating works out only to ½ anna per square yard. BHC 0·05% was found to be very effective against the adults too.

Acknowledgment: The authors are thankful to Sri K. P. Anantanarayanan, Government Entomologist, Coimbatore for the valuable help rendered in preparing this note.

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Entomology Section,
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E. V. ABRAHAM and
T. S. MUTHUKRISHNAN,
Research Assistants.

A Note on *Crotalaria walkeri*.

Crotalaria walkeri is one of the lesser known species of *Crotalaria* and does not appear to be under cultivation anywhere as a green manure crop.

The plant is found to occur wild in the Anamalais on waste-lands, grasslands, on hill-side cuttings and borders of swamps at elevations from 3,500 to 4,000 feet. It is also reported to occur in the Nilgiris and Palani hills at levels up to 6,000 feet.

A brief description of the plant is given below:—

A low herbaceous under-shrub, often semi-scandent, with numerous spreading branches, slightly striate, glabrous or nearly so; young parts very finely pubescent, leaves 2 to 4 inches long on short, stout petioles, oval or lancelolate oval, obtuse or acute, finely mucronate, glabrous above, usually puberulous beneath, stipules variable, usually very small, either subulate-linear or linear-lanceolate and very acute, or often falcate or semi-lunar, rarely foliaceous. Flowers rather large, one inch, on rather slender, short pedicel, 4 to 10 inches, erect, loose terminal racemes with two minute bracts immediately beneath calyx, calyx very finely puberulous, tube broadly campanulate, segments narrowly triangular-acuminate, pod $2 - 2\frac{1}{2}''$, tapering to distinct stalk at base, oblong, much inflated, especially at truncate apex tipped by short, broad-style base, very finely puberulous, seeds 7 to 10.

The plant is very hardy and drought-resistant and is not browsed by animals. It is able to grow on a variety of soil conditions and is easy to establish on land where other species of *Crotalaria* such as *C. anagyroides* and *C. striata* are difficult to establish. It is fairly rapid in growth, and attains a height of about 4 to $4\frac{1}{2}$ feet and a spread of 3 to 4 feet within about 180 days. At this stage flowering also commences. It branches very profusely and branches arise from about one foot from ground level. After flowering it makes mostly lateral growth and in due course becomes a thicket, giving the ground a close cover.

The plant probably lives for about four years. It can be lopped twice a year for green material and an acre will yield not less than 30,000 pounds per year.

Propagation is from seeds or cuttings. A pound contains about 13,000 seeds and they give about 70% germination. They can be sown immediately after collection, and take about six days for germination. Seedlings stand transplanting well. Cuttings give over 80% success in rooting and can be directly planted out in the field during the rainy months. Self-sown seedlings appear in large numbers during rains.

Examination of a 6 months-old plant has shown that the tap root reaches a depth of about 16 inches and the lateral roots spreads to 60 inches. The roots contain innumerable bacterial nodules.

The plant appears to be highly suitable for reclaiming eroded lands, suppressing grass and keeping under cover plantation land which is rested between two cycles of crops. In view of its hardiness and ability to supply large quantity of green material it appears well worth a trial in wet and garden lands for supply of green manure.

Government
Cinchona Plantations,
Post Cinchona.

C. VENKITASESHAN,
Technical Assistant.

Reviews

Sindrome Policarencial Infantil (Kwashiorkor) and its prevention in Central America. *by Marcel Autret and Moise Behar (F. A. O. Nutritional Studies, No. 13, Food and Agricultural Organisation of the United Nations, Rome. Oct. 1954; Orient Longmans Ltd., Madras.*

We have for review the above publication of the F. A. O., on the results of a nutritional survey made in Latin America. The purpose of the survey was to compile data on the relation beween the syndrome associated with protein deficiency to similar syndromes found in other parts of the world. Thus the joint F. A. O./ WHO Expert Committee on Nutrition, after reviewing a report on *Kwashiorkor* in Africa by Brock and Autret decided to send a joint mission to Central America in 1951 and a second mission to Brazil in 1953. The Central American mission began work in November 1951 and toured Guatemala, Honduras, Nicaragua, Costa Rica and Panama. A regrettable omission was Mexico; although Mexico was one of the Latin American countries where *Kwashiorkor* has been fully studied and where a scientific research programme was being conducted.

The publication describes the methods adopted in carrying out the investigation, the clinical features and medical aspects of the syndrome, the extent and intensity of its prevalence, the influence of diet on the syndrome and the various aspects of the treatment measures tried and concludes by suggesting ways and means of preventing the disease.

The term *Kwashiorkor* which has gained currency by usage to indicate the the complex of malnutrition symptoms associated with protein deficiency in children, is derived from one of the Gold Coast languages. Since in actual practice, however, it is not possible to draw any sharp distruction between under-nourishment and malnutrition, the term is used to indicate broadly the main etiological factors and the stage of life when the syndrome is most common.

Kwashiorkor was found to occur in the Central American countries among poor people and the protein deficiency was almost always accompanied by a deficiency of calories and important nutrients. Retardation of growth, both in height and weight was the commonest and earliest of signs, though little or no attention is usually given to it to the poor families in which the disorder occurs. Functional retardation resulting from atrophy of muscles is also quite common, some of the children being unable to sit upright at ten months and unable to walk unaided even when two years old. The psychological changes are even more striking and characteristic, showing a mixture of apathy and irritability; "the children are indifferent to their surroundings and immobile for hours with open eyes and expressionless, mask-like features; often accompanied by a monotonous wailing without tears and the children refuse all food and whimper at the least touch" Physical and physiological syptoms are lack of appetite, diarrhoea, vomiting; liver enlargement and oedema. This last symptom is often associated with dehydration, thus oedema is marked in the extremities like the legs, feet and hands, while the trunk and face show wrinkling and loss in turgor of the skin tissues. The skin gets dry and even scaly, with pigmentary changes, peeling off and ulceration of skin-folds, while the hair becomes sparse and lifeless.

The proper treatment is essentially dietary. Where the disease has not assumed any serious stage, and the digestive troubles are not acute, a complete and balanced diet, consisting largely of skim milk, animal protein and fresh vegetables soon induce a marked improvement and return to normal health. Unfortunately in many cases the children are taken home by their parents before the cure is complete; in such cases relapses often occur and the mortality rate in these relapses is regrettably high.

It is made quite clear that the disorder is found chiefly among the poorer classes and hence the true cause is only poverty. From poverty arises ignorance and result in faulty dietary practices that eventually take a heavy toll of infant lives. The primary preventive measure is therefore to increase the production of animal and vegetable proteins. The sources of animal proteins like milk, fish and allied by-products should be increased. Maize, which forms the staple cereal in this region is deficient in certain essential amino-acids like tryptophane; this deficiency could be remedied by utilising legumes and other dietary supplements which again calls for some systematic nutritional studies and technological research. Education in nutrition and especially the education of mothers in better feeding habits for themselves and for their children during weaning time should be organised on a permanent basis.

The brief summary given above will suffice to show how closely applicable these findings are to the poorer classes in India and how very necessary it is not only to carry out similar surveys here to determine the extent and intensity of such nutrient deficiencies amongst the numerous ethnic groups in different regions of this sub-continent, but also to bring home the urgent need that exists to improve the general level of nutrition by all possible means in order to build up a healthy nation out of our children of today.

The booklet is in every way excellent and conforms to the standard that one has now come to expect of all F. A. O. publications. The subject is important and of interest to all countries, and the treatment is succinct and scholarly without being pedantic. The recommendations too, are eminently practical, and deserve to be studied by every one interested in the health and welfare of children in particular and the nation generally.

DONATIONS TO M. A. S. U.

We are happy to acknowledge a donation of Rs. 100/- from Sri M. R. Balakrishnan, F. A. O., Irrigation Agronomist, Bangkok, Thailand, to the Madras Agricultural Students' Union. Such donations from our well-wishers would help the Union and are always welcome.

The Management.

Gleanings

(i) **Bigger Cardamom Yields:** Every cardamom grower has now the prospect of growing a bigger cardamom crop if he puts into practice some of the findings of research on this crop. Research was conducted for about a decade under a scheme jointly sponsored by the Madras State Department of Agriculture and the Indian Council of Agricultural Research. Cardamom, one of South India's important spice crops, is planted on about 1,20,000 acres in Tirunelveli, Madurai, Coimbatore, Nilgiris, Malabar, South Kanara of Madras State and contiguous areas in Travancore-Cochin, Mysore and Coorg. Cardamom likes humid forest regions 2,000 to 4,000 feet above sea level, rich in humus. A heavy but evenly distributed rainfall helps in getting higher yields, but a low rainfall, steep slopes subject to erosion and not enough of natural tree shade — all these adversely affect the crop.

Among the several types in cultivation, two are by far the most important. One is the erect-panicled type which bears large pods. It is indigenous to the southern parts of the State, viz, Tirunelveli. It shows wide variations in yield, size and shape of pods. The crop is subject to damage by thrips, though the mosaic or *Katte* disease is relatively less evident in this type. The second type grows along the Western Ghats from the Tambaraparani in the South to North Kanara in the North. Its panicles grow prostrate and the pods are small. No wide variations in yield, size and shape of pods in this type are noticed. This type is resistant to thrips, but is susceptible to mosaic in varying degrees. An exhaustive study of the different types led to the selection of two varieties, Nos. 71 and 81. The varieties are characterised by five-fold yields over the planters' bulk. Further, while S. No. 81 is suitable for heavy rainfall areas, S. No. 71 is adapted to regions of lesser rainfall. Cardamom is commonly propagated from rhizomes. In the choice of rhizomes, the larger ones aid in a quicker establishment of the clump and a better growth. Propagation from rhizomes, however, is one cause for the spread of the mosaic disease. In establishing new plantations, particularly in mosaic — free areas, seed propagation should be preferred.

Raising the Nursery: Seeds do not generally germinate very well and besides the seedlings are susceptible to many diseases in the nursery. After investigation over several years, a successful method of raising nurseries has been evolved. This consists in sowing freshly extracted seeds selected from mature, fully developed pods and freed of mucilaginous matter, during the months of December to March. Sowing is done in raised beds under the shade of trees and close to a dependable source of irrigation. Seeds are sown thinly and a thick mulch of dried leaves is given. By this method, the percentage of germination increases from 15 to 60 per cent. When the seedlings have developed sufficiently, fortnightly sprays with one per cent Bordeaux mixture keep down the several diseases affecting the seedlings. The major loss of produce in the field due to infestation by thrips and the incidence of the clump rot disease. Experiments have definitely established that the thrips can be effectively controlled and the loss of crop reduced from 80 to 10 per cent by spraying with nicotine sulphate (0·05 per cent) DDT (0·25 per cent) or 'Antoxene' 0·2 per cent) or dusting with 'Gammexane' (D. 0·250 per cent.

Spraying in cardamom plantations, as a rule, is either impracticable or expensive and, therefore, dusting is more commonly advocated. Periodical weeding and clearing of old and dead shoots in addition to insecticidal methods

reduces the insect population and lessens the severity of injury to the capsules. The clump rot infection has been traced to a *Pythium* fungus. This can be controlled by application of lime at the rate of three ounces per clump in the affected plantation, followed a month or two later by application of ammonium phosphate or superphosphate, at the rate of three ounces per clump. The above measures, besides arresting the disease, stimulate fresh growth of aerial shoots and enable the diseased clumps to revive quickly.

(Indian Farming, June 1955)

(ii) **Treating Groundnut Seed:** Treating groundnut seed with a fungicidal dust has been found to increase the germination capacity of the seed and give a better stand of the crop.

Treating the seed with 'Agrosan G. N.', 'Tillex' or 'Ceresan' increased germination capacity of groundnut seed from 10 to 13 per cent. Seed treated with 'Ceresan' controlled collar rot and wilt of groundnut.

Any of the three fungicidal dusts can be used for treating groundnut before sowing, at one part of the fungicide to 400 parts of seed. Seed is treated either in a seed mixer or by shaking it with the fungicidal dust for about five minutes in any closed vessel. (Indian Farming, June 1955)

(iii) **Fertilizing Cotton:** Experiments on farmers' fields in the Hariana tract of the Punjab have confirmed the fact that there is a progressive increase in yield of kapas with increasing doses of ammonium sulphate, but beyond 75 pounds of nitrogen per acre, the increase in yield is negligible and is not likely to pay for the additional cost of manure. The tract grows about 1·25 lakh acres of cotton every year, and is an important long-staple growing zone of the State. The application of upto 75 pounds of nitrogen (4½ maunds of ammonium sulphate) is now being recommended to the Hariana tract cotton growers for increasing yields. (Indian Farming, June 1955)

(iv) **A New type of ragi suitable for southern districts:** In the southern districts of Madurai, Ramanathapuram and Tirunelveli ragi is grown under irrigation in an area of about 1,75,000 acres. The crop is grown in two seasons, one during summer i. e. April to July and the other in the main season i. e. middle of September to December. Nearly two-thirds of the area under this crop is cultivated in the main season. In the early years work on the improvement of this crop was carried out at the Agricultural Research Station, Koilpatti, by getting selections from the Millet Breeding Station, Coimbatore and conducting trials with local ragi as control to assess their yielding capacity. Out of a number of selections like E. C. 47, Co. 1, Co. 2, Co. 4 etc., compared with the locals, only Co, 2 was found to be suitable for the summer season of this tract. Selection work in this crop was also done for a long time and the strain K. 1 ragi giving 18% more yield of grain than the locals was released in 1948.

Ragi K. 1. being a heavy yielder was found to lodge at harvest time. To get over this defect further work was done by selection. One selection, K. R. 4 gave a very good yield as good as K. 1 strain but without lodging. K. R. 4 is a purple-pigmented type and is resistant to blast disease. This selection was tried against the local ragi at various centres in the southern districts and very encouraging reports were received. On an average the yield of this selection is 20% over the local ragi. A large quantity of seed is being produced at the Agricultural Research Station, Koilpatti. Interested ryots can place their indents to the nearest Agricultural Demonstrator who will arrange for its supply.

(v) **Manure Pepper vines for better yields:** Pepper plantations in our State are seldom manured, unlike those in other countries. In South-East Asian countries like, Sarawak, Malaya, Cambodia etc., pepper vines are regularly manured. This regular application of manures to vines is reflected in their yield. The average annual yield of a vine in our state is about 0·75 lb. as against an average yield of about 3 lb. per vine in Malaya and Sarawak. Since the yield of pepper vine in any variety depend on the volume of new growth from the lateral branches of the vine, the yield is fostered by abundance of lateral branches and of new shoots from the lateral branches. Application of nitrogenous manure in conjunction with phosphatic manure and lime has resulted in increased yields.

From a consideration of all aspects of proper cultivation, the following manurial schedule may be recommended.

For vines in full bearing:

1. Half pound of slaked lime per vine may be applied in March–April with the receipt of summer showers in alternate years.

2. Well-rotten cattle manure or compost at the rate of about 20 lb. per vine may be applied before the advent of the South-West monsoon.

3. One to two lb. of groundnut cake, castor cake or fish manure per vine may be applied in two doses, one in May June and the other in August–September.

4. Two to four oz. of sulphate or muriate of potash or one or two lb. of wood ash per vine may be applied in August–September.

5. Four to eight oz. of ammonium sulphate per vine may be applied in two doses, one in August–September and the other in October–November.

6. Half to one lb. of superphosphate or bonemeal per vine may be applied in two doses one in August–September and the other in October–November.

Manurial Schedule for young vines.

1. Slaked lime at the rate of about 4 oz. per vine may be applied in March–April in alternate years.

2. Liquid cattle manure may be applied 3–4 times in a year or well-rotted cattle manure or compost at the rate of 10 lb. per vine may be applied, preferably mixed with cattle manure.

3. Ammonium sulphate about 2 oz. in an year per vine, may be applied preferably mixed with cattle manure.

4. Groundnut cake, castor cake or fish manure, about 3 oz. per vine, may be applied in two doses, one in June and the other in August–September.

5. Superphosphate or bonemeal about 4 oz. per vine may be applied in August–September.

6. Muriate of sulphate of potash about 2 oz. or 8 oz. of wood ash may be applied in August–September.

Application of manures except slaked lime is to be 6–12 inches away from the stem of the vine all round and within a radius of 2–5 feet all round, depending upon the age and growth of the vines. For young vines apply nearer and for older ones farther. Slaked lime may be applied even close to the vine and to a radius of 2–5 feet alround. Except potash and ammonium sulphate, the other manures are to be worked into the soil to a depth of about of 6 inches. Potash manures are to be applied only about a fortnight before or after the application of ammonium sulphate. To reduce soil erosion, to replenish the humus content and to smother weed growth, to fix atmospheric nitrogen in soil and to prevent soil desiccation during summer, a cover crop of *Calopogonium mucunoides* should be grown in pepper plantations.

Pesticide Hazards: Some of the newer pesticides are remarkably effective and at the same time very dangerous if mishandled — not that the older pest — killing materials were to be treated carelessly. Like electricity, which is eminently useful, but extremely dangerous if not properly surrounded by suitable precautions, pesticides must be insulated from irresponsible people and uncontrollable conditions likely to cause accidents. A closed system for handling insecticides is an important safety measure. Potentially dangerous materials are introduced into spray tanks by mechanical means rather than poured by hand from shipping containers many times a day, thus multiplying accident opportunities.

Weeds: It has been estimated that the cost of controlling weeds, in actual cash and labour charges and in crop losses, is greater than the combined cost of fighting all other pests that plague agriculture. Further, weeds use up astonishing amounts of water; thus Bermuda grass *(Cynodon dactylon)* and similar persistent weeds use about 1,000 pounds of water for each pound of weeds (dry weight) that grow in the field space. (California Citrograph 40, April 1955) [T. R. N.]

Can cattle avoid infected grass? It is suggested that the bovine habit of not grazing grass growing in the vicinity of cattle-dung has a protective value against parasitic infection. In cattle lung-worm infection, it is necessary that the bovine host should ingest cattle dung, for the parasite to gain entry into the body of the host.

By watching cattle in a field infested with *Dictyocaulus viviparus* it is confirmed that bovine grazing is indeed highly selective, because grass samples collected from "grazed" spots contained far less of the larvae of cattle lung-worms than random grass samples. It is therefore clear that the success of the animal in avoiding infection depends upon something more than its ability to distinguish between the short grass and the rank tussocks of herbage growing round pats of cattle-dung. (Nature; 175, June 1955)

Efficacy and economics of liquor ammonia as a fertiliser to Cotton: (Ind. Cotton Gr. Review 9 P. 27) Nitrogen in the form of ammonium sulphate costs 14 annas a pound while it works out to Rs. 5—4—0 as ammonia. Therefore, unless it is very much cheaper there is no great point in recommending liquid ammonia, because of the difficulties and hazards in handling and transporting the material. [T. R. N.]

M. Sc. DEGREE

Sri N. V. Sundaram, Assistant in Mycology, has been declared qualified for the M. Sc. degree by the University of Madras, the subject of his thesis being Study of Rusts occurring in the neighbourhood of Coimbatore.

Weather Review — For the month of August, 1955.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenam-bakkam)	9·1	+ 4·5	26·5
	Tirur-kuppam*	7·2	— 2·4	25·6
	Vellore	2·3	— 3·4	19·4
	Gudiyatham*	3·5	— 1·0	17·5
East Coast	Palur*	4·0	— 1·4	33·7
	Tindivanam*	10·3	+ 5·7	24·9
	Cuddalore	6·0	+ 1·2	33·3
	Naga-pattinam	5·6	+ 2·5	22·6
	Aduturai*	6·4	+ 1·8	24·4
	Pattukottai*	6·7	+ 2·3	16·3
Central	Salem	4·0	— 2·6	21·7
	Coimbatore (A. M. O.)*	0·4	— 0·9	10·8
	Coimbatore	0·4	— 0·8	13·2
	Tiruchira-palli	1·4	— 2·7	15·4

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
South	Madurai	2·1	— 2·0	14·7
	Pamban	0·2	— 0·4	13·9
	Koilpatti*	0·6	— 1·6	10·4
	Palayam-cottai	0·0	— 0·7	9·5
	Amba-samudram*	0·0	— 0·4	15·7
West Coast	Trivandrum	2·1	— 4·6	41·0
	Fort Cochin	4·8	— 9·1	99·1
	Pattambi*	6·1	— 7·6	66·5
	Kozhikode	9·5	— 7·6	102·7
	Taliparamba*	15·8	- 10·1	105·8
	Wynaad*	6·7	— 8·3	54·5
	Nileshwar*	17·9	— 7·0	143·3
	Pilicode*	13·3	— 9·8	116·2
	Mangalore	25·9	+ 0·4	116·9
	Kankanady*	24·6	+ 0·1	116·2
Hills	Kodaikanal	2·2	— 4·8	38·3
	Coonoor*	1·2	— 2·6	21·1
	Ootacamund*	2·2	— 1·7	41·2
	Nanjanad*	2·6	— 5·3	41·3

Note:— * Meteorological Stations of the Madras Agric. Dept.

In the first week of the month the South-West monsoon was fairly active along the West Coast and also in Travancore-Cochin. Localised showers were received at a few places in Tamilnad as well. The monsoon became weak in the West Coast on 8—8—1955 and remained so till 11—8—1955. But in this period mild showers were received at a few places in Tamilnad. The monsoon became temporarily active again along the West Coast on 12—8—1955 and remained so for four days. The districts constituting Tamilnad had some drizzles or light showers till 15—8—1955.

Coastal areas in Tamilnad received good rains on 16—8—1955. On 17—8—1955 the monsoon strengthened in Travancore-Cochin. Three days later widespread rains were received in Malabar-South Kanara districts and also at a few places in Tamilnad and this condition remained practically unchanged till 24—8—1955. On 25—8—1955 conditions became unsettled in the West Central and adjoining North-West Bay of Bengal, with the result that rainfall was heavy in the West Coast and fairly heavy in a few places in Tamilnad. From 26—8—1955 to the end of the month West Coast had some localised rains and a few places in Tamilnad had light showers.

Both in the West Coast and on the hills rains received during August 1955 were below normal. The rains received in Tamilnad were quite insufficient for agricultural purposes.

The note-worthy rainfalls and the zonal rainfall in inches are furnished below:—

Note-worthy Rainfalls			Zonal Rainfall			
Date	Name of Place	Rain-fall in inches	Name of Zone	Average rainfall for June, 1955	Depar-ture from normal	Remarks
1/8/55	Nileshwar	3·2	North	5·5	— 0·6	Just below normal
7/8/55	Madras (Meenambakkam)	2·0	East Coast	6·5	+ 2·0	Above normal
do.	Nagapattinam	2·0	Central	2·1	— 1·3	Below normal
12/8/55	Mangalore	5·0	South	0·6	— 1·0	Below normal
do.	Madurai	2·0	West Coast	12·7	— 6·7	Below normal
22/8/55	Madras (Nungambakkam)	4·0	Hills	2·1	— 3·6	Far below normal

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 14—9—1955.

C. B. M. & M. V. J.

News and Notes

The students of the II year B. Sc. (Ag.) class went on tour from 16th of this month to 24th. The College was closed on 25th for the Michaelmas holidays.

During this month we had a number of Hockey, Volley-Ball and Basket-Ball matches with teams from Colleges and Schools of Mangalore, Udipi and Tiruchirapalli.

The night school run by the Social Service League was also closed for the vacation.

Departmental Notifications

Gazetted Service—Postings and Transfers.

Name and present post	Posted as
Venkataraman, V. G., Marketing Asst., Madras,	Spl. D. A. O., (Crop Sampling), Tanjore.

Upper Subordinates

Name and present post	Posted as
Abdul Samad, N. M., Rajapalayam,	A. D., Ettayangudi.
Andrew Desabandhu, Vannarpettai,	Cotton Asst., Koilpatti.
Antony, C. R., Kozhikode,	A. D., Kinathukadavu.
Alfred, Trichy,	A. D., Thirumayam.
Appadurai, R., A. R. S., Koilpatti,	Millet Asst., Coimbatore.
Balasubramaniam, K. M,, Paddy Asst., Coimbatore,	Paddy Asst., Tirur.
Balakrishnan, C., Dharmadam,	Asst., in Mycology, Ootacamund.
Balasubramaniam, V. P., Dindigul,	A. D., Shembanarkoil.
Bhaskaran, P., Olavakkot,	A. D., Mudukulathur.
Chami, A., A. D., Ellayangudi,	A. D., Pollachi.
Chellappa, K. K., Kosepet,	A. D., Arni.
Chandrasekhara Shetty, Triplicane,	Entomology Asst., Kasargode.
Doraiswami, K. N., A. D., Shembanarkoil,	A. D., Salem.
Danesh Rao, H., Mangalore,	A. D., Palamedu.
Divakaran, N. K., Nellayi,	A. D., Avoor.
Divakaran, K., Asst., in Millets, Coimbatore,	A. R. S., Koilpatti.
Gopalakrishnan, A., A. D., Ramapuram,	Extension Officer, in Agri. Byadoor.
Gopalakrishnan, P. K., Fruit Asst. Coimbatore,	Ginger Asst., Wynaad.
Gunaseelan, L. M , Adiperananoor,	Paddy Asst., Palur.
Jose, P. C., Kottapaddy,	Extension Officer, Ootacamund.
Gangadharavarman, V. N., Vandall,	Pepper Asst., Taliparamba.
Jayapalan, P., Palghat,	A. D., Tirupathur, Ramanathapuram Dt.
Jacob, K. G., Thittamal,	A. D., Uthukuli.
Kannan, S., Coimbatore,	A. D., Andhiyur.
Kumaran, Pullode,	Soil Conservation Asst., Kangayam.
Kanakasabapathy, T., Udamalpet,	A. D., Kalasapakkam.
Kandaswami, T. K., P. P. A., Patttukottai,	Asst. in Mycology, Coimbatore.

Name and present post	Posted as
Manamohan Lal, S., Paddy Asst., Palur,	Paddy Asst., Coimbatore.
Mohamad Azam, C. A., Coimbatore,	F. M., Satyamangalam.
Mohamed Ghouse, Madurai,	A. D., Theni.
Navaneethakrishnan, T. V., P. P. A., Pattukottai,	P. A. to D. A. O., Pattukottai.
Radhakrishna Reddy, A., A. D., Villivakkam,	A. D., Cuddalore.
Ramakrishnan, G., Entomology Asst., Coimbatore,	Fruit Asst., Coimbatore.
Ramana, G. V., P. A. to D. A, O., Trichy,	Asst., Lecturer in Agri. Coimbatore.
Ravindranath Menon, C., Puthiyuru,	A. D., Kuttalam.
Swaminathan, K., Paddy Asst., Coimbatore,	Paddy Asst., Aduthurai.
Srinivasan, P. M., Entomology Asst., Kasargode,	Entomology Asst., Coimbatore.
Stanley Francis Bernad, Thalayuth,	Spl. A. D., Cotton, Ettayapuram.
Sundaravaradan, S., Madras,	A. D., Villivakkam.
Swaminathan, R., Palghat,	Millet Asst., Coimbatore.
Samuel, T. V., Karungapalle,	Certification Inspector, Rajapalayam.
Sivaraman, A. K., Ottapalam,	A. D., Pennadam.
Subramaniam, T. L., Coimbatore,	Asst., in Cotton, Coimbatore.
Sundaram, V., P. A. D., Rasipuram,	A. D., Sankaridrug.
Selvaraj Carvalho, A. D., Sankari,	A. D., Trichy.
Sankarasubramaniam, T. K., P. A. to D. A. O., Pattukottai,	P. A. to D. A. O., Cuddalore.
Varadarajan, K., Saidapet,	Chemistry Asst., Coimbatore.
Venkatarangam, R., Cane Asst., Palur,	O. S. Dev. Asst., Cuddalore.
Thulasidas, G., Ginger Asst., Ambalavayil,	Cane Asst., Palur.

We are all strong enough to endure other people's misfortunes.

—*La Rochefoucauld.*

* * *

"First she's gloomy, then she's gay" reflects the old grand-mother, "that means she's in love". "Are you sure"? asks her son — "Yes" is the reply. "What a memory"! he exclaims.

* * *

After giving a talk on "How to train your memory" the speaker shook hands all round and departed, leaving his hat behind.

DISTRICTS
S. ARCOT; COIMBATORE
MALABAR; S KANARA
RAMANATHAPURAM
TIRUNELVELI
NORTH ARCOT

MARKET COMMITTEES CHRONICLE
DEVOTED TO
A FACTUAL RECORD OF
SERVICE FOR REGULATED MARKETING

CROPS
COTTON; GINGELLY
GROUNDNUT
COCONUT
ARECANUT
TOBACCO

Review of Market Conditions of Commercial Crops in the areas of Market Committees for August, 1955

Errata (M. A. J., August 1955)

Page 359, para 6, line 3 for figure 35,800 read as 53,800.

Page 361, para 1, line 1 for figure Rs. 80 to 19—6—0 read as Rs. 18—0—0 to 19—6—0.

Page 360, para 2, line 3, 780 for 1st quality read as Rs. 680.

The *kapas* market at Tiruppur opened with a stock of 15,463 pothis of Cambodia and 2,824 pothis of Karunganni *kapas* as the carryover of of the previous month. Arrivals during the month accounted for 18,158 pothis of Cambodia and 3,747 pothis of Karunganni which included a total of 18,426 pothis received from other districts. Disposal of *kapas* amounted to 20,740 pothis Cambodia and 3,957 pothis of Karunganni of which 9,090 pothis of Cambodia and 1,584 pothis of Karunganni *kapas* were used for ginning locally. A quantity of 12,881 pothis of Cambodia and 2,614 pothis of Karunganni remained as closing stock at the end of the month.

The cotton market in general was very active during the month.

2. *Koilpatti:* In Koilpatti market there was an opening stock of 500 pothis of Karunganni *kapas* at the beginning of the month Fresh arrivals from neighbouring villages amounted to 1,000 pothis. Nearly 1,000 pothis were ginned and sold to the milles, leaving a closing stock of 500 pothis at the month end.

Though the season for Karunganni has come to a close it has been reported that 10,000 pothis are still left over with producers.

3. *Ramanathapuram District:* The three markets of Virudhunagar, Sattur and Rajapalayam put together opened with a carryover stock of 1925 cdys. of Karunganni cotton lint. Arrivals during the month amounted to 6,120 cdys. of lint which included 2470 cdys. of Karunganni lint and 3,650 cdys. of Madras-Uganda. Disposals of cotton during the month accounted for 6,245 cdys. of lint which included 2,595 cdys. of Karunganni and 3660 cdys. of Madras-Uganda leaving a closing balance of 1,800 cdys. of Karunganni cotton lint at the close of the month.

The *kapas* market at Virudunagar, Sattur and Rajapalayam opened with a stock of 10,350 pothis of which 6,350 pothis were Karunganni cotton and 4,000 pothis of Madras-Uganda. Receipts in the month accounted for 35,550 pothis of which 10,400 pothis were Karunganni and 25,150 pothis Madras-Uganda. Disposals during the month were of the order of 38,300 pothis including 15,650 pothis Karunganni and 22,650 pothis of Madras-Uganda. A stock of 7,600 pothis of Madras Uganda was left over as the month—end stock. The market for Karunganni was in general brisk and active during the middle of the month and brisk transactions in Madras-Uganda were registered only in respect of good quality *kapas.*

4. *South Arcot:* The markets of South Arcot District started with an opening balance of 83 pothis of cotton *kapas,* while the receipts during the month amounted to 298 pothis. Disposals accounted for 226 pothis leaving a closing stock of 105 pothis at the end of the month.

Prices: 1. *Cotton Lint:* The price of lint in Tirupur market revealed an upward trend during the month. Cambodia lint went up from Rs. 900/- to Rs. 960/- and Karunganni from Rs. 785/- to Rs. 825/- per candy during the month. The rates for Cambodia lint per candy touched the level of Rs. 980/- by the close of the month.

Prices of Karunganni lint continued to be steady at Koilpatti market. The prices were fluctuating between Rs. 650/- to Rs. 700/- per candy according to quality. The prices of Madras-Uganda cotton also remained firm during the month and were placed at Rs. 1,130/- per candy for certified quality and Rs. 1,000/- per candy for uncertified quality.

Market for Karunganni cotton lint in the three markets of Virudhunagar, Sattur and Rajapalayam opened steady at Rs. 650/- to Rs. 700/- for I Crop, Rs. 610/- to Rs. 630/- for II Crop good quality and Rs. 545/- to Rs. 575/- for II Crop second quality and Rs. 490/- to Rs. 515/- for Tinny-Karunganni mixture per candy. The beginning of the month

experienced a slight recession in prices but later the market steadied itself and throughout the remaining period stood as follows :—

I Crop	Rs.	656–686 per Candy
II ,,	Rs.	556–571 ,,
Tinny-Karunganni Mixture	Rs.	500–516 ,,

The prices of Madras-Uganda cotton lint opened at Rs. 1,086/- to Rs. 1,131/- for M. U. I. certified, Rs. 1,186/- for M. U. II certified and Rs. 986/- for uncertified qualities. There was a slight upward trend during the month and the market closed better and firm at Rs. 1,141/- to Rs. 1,151/- for M. U. I. Certified, Rs. 1,236/- to Rs. 1,256/- for M. U. II Certified and Rs. 1,006/- for uncertified Madras Uganda per candy. There was a greater demand for certified lots of Uganda.

2. **Kapas:** The price of *kapas* in Tirupur market maintained a steady upward trend during the month. The prices of Cambodia and Karunganni *kapas* were ruling at Rs. 110/- to Rs. 114/- and Rs. 90/- to Rs. 95/- per pothi against Rs. 116/- to Rs. 127/- and Rs. 97/- to Rs. 100/- that was prevailing during the corresponding month of last year.

The price of Karunganni *kapas* in Koilpatti market opened at Rs. 77/- per pothi and declined gradually and closed at Rs. 74/- per pothi. Price of Madras Uganda *kapas* which opened at Rs. 115/- per pothi rose up to Rs. 120/- by the middle of the month and thereafter maintained a steady tone.

The prices in the markets of Virudhunagar, Sattur and Rajapalayam for Karunganni *kapas* opened at the rates of Rs. 70/- to Rs. 84/- for I Crop and Rs. 53/- to Rs. 63/- for II Crop and after a slight recession, kept up a steady level at Rs. 76/- to Rs. 80/- and Rs. 35/- to Rs. 68/- per pothi respectively. The market for Madras Uganda *kapas* in these markets opened at Rs. 132/- to Rs. 136/- for M. U. II Rs. 122/- to Rs. 131/- for I quality Madras Uganda and Rs. 105/- to Rs. 118/- for II quality Madras-Uganda. The prices ruled firm for the I and II quality during the month while cotton revealed an upward trend and closed higher at Rs. 136/- to Rs. 149/- per pothi.

The average prices of *kapas* (Cambodia) in the markets of South Arcot District ranged from Rs. 70/- to Rs. 74—8—0 per pothi during the month.

3. **Cotton Seeds:** The price of cotton seeds in Koilpatti market opened at Rs. 22/- per pothi at the commencement of the month and gradually advanced to Rs. 25—8—0 at the month end. The prices of Karunganni cotton seeds at the markets of Virudhunagar, Sattur and Rajapalayam markets opened in the range of Rs. 18/- to Rs. 20/- and improved to Rs. 22/- to Rs. 23—8—0 per pothi of 252 lb. The Uganda seed market which opened at Rs. 15/- per pothi of 252 lb. went up to

Rs. 15—12—0 to Rs. 16/- in the middle of the month and closed at Rs. 15—6—0 to 15—12—0 at the closing period under review.

II. **Groundnut:** (In this section Candy=531 lb. of Kernels; Bag=80 lb. of pods.) The groundnut markets in South Arcot districts opened with a stock of 2,741 tons of kernels with the trade at the beginning of the month. Arrivals into eight regulated markets amounted to 9,586 tons. Receipts from outside the district and other States included 628 tons and 54 tons respectively. Disposals to oil millers and country chekkus amounted to 4,973 tons and 129 tons respectively. Despatches to places outside the district and the State accounted for 2,253 tons and 4 tons respectively. A closing balance of 5,650 tons of kernels remained at the end of the month.

The average prices of groundnut kernels in the several markets of South Arcot district ranged from Rs. 99—5—0 to Rs. 109—15—0 per candy during the month. The prices of kernels at Virudhunagar market which opened at Rs. 110/- to Rs. 115/- per candy steadily increased in the middle of the month and rose upto Rs. 118/- to Rs. 120/- and finally closed slightly lower at Rs. 114/- to Rs. 118/- at the closing period.

III. **Gingelly:** (Bag in this section is 168 lb. each.) The stock of gingelly in the markets of South Arcot district opened with 728 bags at the beginning of the month. Arrivals in the six markets were 559 bags of which 407 bags were received at the Viruddachalam market alone. Receipts from outside districts from Tiruchirapalli and places in North Arcot district amounted to 110 bags in all oil mills and country chekkus consumed 16 bags and 338 bags respectively during the month. Despatches to other districts and States amounted to 75 bags and 20 bags respectively, leaving a closing stock of 946 bags.

The average prices in different markets of South Arcot district ranged from Rs. 30—2—0 to Rs. 40—1—0 per bag of 168 lb. each.

IV. **Coconut and its Products:** 1. *Copra:* The four markets of Malabar district (Kozikode, Ponnani, Badagara and Tellicherry and Dharmadam) opened with a stock balance of 7·4 million nuts. Receipts into all these markets amounted to 7 million nuts. Despatches and local sales accounted for 5·4 and 0·2 million nuts respectively leaving a month end stock of 8·5 million nuts.

Prices of coconuts in Malabar markets stood in the range of Rs. 70/- to Rs. 100/- per 1,000 husked nuts. The rates at Mangalore market ranged for Rs. 140/- to Rs. 170/- for 1,000 raw nuts and Rs. 165/- to Rs. 210/- for dry nuts.

2. *Copra:* (In this section candy is 700 lb.) The two markets of Malabar at Kozhikode and Badagara opened with a carryover stock of

1,813 cdys. while the arrivals during the month accounted for 3,808 candies. Despatches and local sales were of the order of 2,465 candies. Despatches and local sales were of the order of 2,465 candies and 2,310 candies respectively, leaving a closing stock of 1,846 candies at the end of the month.

Prices of copra in Malabar district showed a slight decline during the month. The price ranges as between the several varieties in the different markets are extracted below.

(Prices per candy of 700 lb.)

	Kozikode		Badagara	
Varieties	Maximum	Minimum	Maximum	Minimum
Office	315	297	305	290
Edible	335	315	320	315
Rajpur	400	375	400	375
Madras	370	370	340	340

Prices of Copra in Mangalore markets ranged between Rs. 285/- to Rs. 305/- per candy of 660 lb.

V. **Arecanut:** (In this section bag = 100 lb.) The stock of arecanuts in Mangalore market opened with a quantity of 3,587 cwt. at the commencement of the month and 1,300 cwt. were added to it by way of receipts. Exports during the month accounted for 1,809 cwt. leaving a closing stock of 3,078 cwt.

The price ranges of arecanuts in Mangalore markets are indicated below :—

(Prices in Rs. per Cwt.)

Varieties	Maximum	Minimum
Choll	180	160
Koka	130	85

The stock of arecanut in Kozikode market opened with 981 bags and 6,466 bags were added by receipts during the month. Despatches took way 5,393 bags leaving a closing balance of 2,054 bags at the end of the month.

VI. **Tobacco:** (In this section candy = 500 lb.) In Coimbatore district the markets started with a carryover stock of 14,145 candies of chewing tobacco and 7,145 candies of cheroot tobacoo at the beginning of the month. Despatches made to places outside the notified areas amounted to 3,846 candies of chewing and 2,116 candies of cheroot tobacoo. The market closed with a stock of 11,776 candies of chewing and 6,755 candies of cheroot tobacoo at the end of the month.

The prices ruling as between different varieties are extracted below:—

Variety	I Grade	II Grade	III Grade
	(Per candy of 500 lb.)		
	Rs.	Rs.	Rs.
1. *Chewing Tobacco, Suncured:*			
(a) Meenampalayam	460 to 520	375 to 435	290 to 350
(b) Other varieties	350 to 400	220 to 275	150 to 200
2. *Cheroot varieties:*			
Sun-cured (grown in Erode and Bhavani Taluks)	225 to 300	160 to 200	120 to 150
3. *Chewing varieties:*			
Pit cured (grown in Palladam & Sulur area)	240 to 320	175 to 225	120 to 150

Review of the Activities of Market Committees during the month of August 1955

Of the seven Market Committees in the State only five in the districts of North Arcot, South Arcot, Coimbatore, Malabar and South Kanara continued to be actively functioning. The activities of Committees at Ramanathapuram and Tirunelveli continued to be restrained due to injunction order of the Madras High Court.

The following progress was made by the Market Committees during the month in the issue of licences under Madras Commercial Crops Markets Act.

Commodities	Sec. 5 (1) A	Sec. 5 (1) B	Sec. 5 (3) A	Sec. 5 (3) B	Weighman A	Weighman B	Broker A	Broker B
North Arcot Market Committee ...	No report							
South Arcot Market Committee ...	136	1,455	140	1,652	190	970	...	5
Tirunelveli Market Committee ...	...	...	...	...	...	...	...	...
Coimbatore Market Committee ...	67	356	73	433	68	385	...	7
Malabar Market Committee ...	25	405	72	1,191	41	207	...	5
South Kanara Market Committee ...	4	213	2	175	...	38	...	...

A—During the month. B—Upto the month.

The total volume of transactions in commercial crops in 13 regulated markets in the State during August 1955 is extracted below:—

Crop	Quantity	No. of Regulated Markets
Groundnut kernels	9,205 tons	8
Gingelly	445 bags	5
Cotton lint	3,414 candies	3
Kapas	9,078 pothis	3
(Candy = 784 lb.	Pothi = 280 lb.	Bag = 168 lb.)

II. Meetings: South Arcot Market Committee: Two meetings were held of the South Arcot Market Committee during the month under report. Among the several subjects taken up for discussion, the most important were the following:—

(a) Sanctioning of a sum of Rs. 100/- for the purchase of seeds and plants for Vanamahothsavam.

(b) The appointment of a clerk at the Committee's cost in the Collectorate to attend to the issue of licences was felt as unnecessary as no other Market Committee is maintaining any clerk as such.

(c) Continuation of the post of the Assistant Secretary in the Committee was decided on owing to heavy work due to addition of two more crops from 1953.

(d) Deletion of the footnote found below, by-law 24 (6) (b) to remove the ambiguity was also resolved on.

Malabar Market Committee: A meeting of the Committee was held during the month. A few of the important subjects considered are extracted below:—

(1) Approval of the action of the Chairman in withdrawing Rs. 25,000/- from fixed deposit in the Malabar District Co-operative Bank and Rs. 15,000/- from current account and investing Rs. 40,000/- in the 4% Madras Loan 1967, with the approval of the Director of Agriculture and in anticipation of the Committee's approval.

(2) Regarding the amendment to rule 36 of the Madras Commercial Crops Markets Rules 1948 to include provisions in the Act for checking vehicles conveying commercial crops, the Committee resolved that sufficient powers may be taken by the Government in the Act itself to enable them to amend Rule 36 so as to make necessary provisions for the Committee's servants to block the roads if and when necessary and search vehicles, animals or conveyances suspected to carry commercial crops.

III. **Special Features:** A conference of Chairman of all the Market Committees in the State was held at Villupuram on 7—8—1955 which was inaugurated by the Minister for Agriculture, Madras. An exhibition explaining the activities of regulated markets arranged by the South Arcot Market Committee was also opened by the Minister on the occasion. All the Secretaries and Chairmen of Market Committees, the two Assistant Marketing Officers and other officers attended the Conference. The Committee on Co-operation appointed by the Govt. of Madras visited Cuddalore O. T. Market on 27—8—1955 to study the working of the regulated markets.

An expert committee appointed by the Government of Bombay to enquire into the working of regulated markets in that State paid a visit to Madras and the regulated markets of South Arcot Market Committee at Tindivanam and Villupuram in the last week of the month. The State Marketing Officer explained to them the working of the act in this State besides taking them to the Regulated Markets.

IV. **Quality Appraisal:** South Arcot Market Committee continued its work on the studies on the quality of groundnut kernels marketed in six of its regulated markets including Panruti on the basis of random sampling. A total of 582 samples of kernels was drawn from arrivals of 23,386 lots of kernels comprising of 5779 tons of kernels and each lot was analysed for quality factors. The broad details of the analysis comprising determination of dryage and total refractions (comprising of (i) Dirt and Foriegn matter (ii) Nuts in shell (iii) Splits (iv) Damaged (v) Brokens and (vi) Shrivelled) are of interest and are extracted below:—

Particulars	Panruti	Cuddalore	Villupuram	Tindivanam	Tirukkoilur	Virdhachalam
1. *Dryage:*						
2% and below	..	4	3	15	4	92
Above 2% and upto 3%	..	6	2	7	..	19
,, 3% ,, 4%	..	6	4	9	13	15
,, 4% ,, 5%	45	106	14	35	87	6
,, 5% ,, 10%	59	16	7	8	..	..
Over 10%	..	..	..	..	..	..
2. *Total refractions:*						
4% and below	5	8	13	4	39	130
Above 4% and upto 8%	8	69	17	16	53	..
Above 8%	91	61	..	54	12	2

(Figures in the above statement relate to the number of samples).

It would be seen from the above statement that dryage was at its minimum, within 2%, in majority of the lots at Vridhachalam (nearly 69·6 of the total number of samples analysed) while it is high in the markets of Cuddalore, Tirukoilur and Tindivanam ranging between 6 and 10% in 76·8%, 83·6%, 47·3% of the total number of samples analysed. At Panruti all the samples showed dryage between 6 and 10%. In the matter of refraction Vridachalam accounted for 98·5% of its samples for refraction under 4% while markets of Panruti and Tindivanam recording alone 8% refraction majority of the samples.

Fifty-two entries were secured for quality competition in groundnut kernels marketed in South Arcot district, as a result of the reduction both in the entrance fees and the quantity eligible for the competition. Better response leading to a larger-scale enlistment of competition is expected in the future.

State Marketing Officer, Madras.

Quality Variations in Groundnuts Marketed in South Arcot District Summer Crop of 1954

by

K. V. NATESAN, B. Sc., (Ag.),
Secretary, South Arcot Market Committee, Cuddalore

The South Arcot Markets for groundnut are purely spot markets. The produce that comes for sale contains moisture ranging anywhere between 2 and 10%, besides refraction such as stones, dust and other foreign matter, shrivelled, broken, split and damaged nuts and nooks in varied proportions. All these together with the moisture content are taken into consideration by the buyers in the determination of prices of the various lots exhibited for sale in the regulated markets of the district. In general the quality of groundnut marketed in the district is not up to the mark. This is due to various causes:

(1) Harvesting pods before they are fully mature.

(2) Want of proper drying of pods before decortication or hand-shelling by beat of sticks.

(3) Defective decortication, and

(4) Excessive wetting of pods before shelling.

Moisture variation is more predominant in many of the lots than refractions, including defective components such as nooks bits, brokens, splits and damaged kernels.

With a view to study the quality factors and their variations in the groundnut as marketed and to assess the normal variation therein so as to determine average quality marketed from season to season and prescribe grade standards for marketing of groundnuts eventually, quality analysis was taken up in five of the eight Regulated Markets under the Committee in the year 1954, by the random sampling method.

These five markets accounted for 85% of the total produce sold through all the eight Regulated Markets and 94·3% of the produce sold in these five assembling centres. They were analysed to determine moisture, foreign matter, shrivelled, brokens splits, damaged, nooks and bits according to the conventional trade practices. Moisture as understood in the trade is the loss on thorough drying and it was determined by sun-drying the samples in muslin bags until constant weights were recorded. The weights of the different components in a representative sample for each lot were determined separately and reduced further to a common basis of refraction as specified in the All-India Standard form of contract. In this report is given the basic information gathered through analysing the samples from May to October 1954 in the five different Regulated Markets of this Committee with details of variations in moisture content, as also the different components grouped in convenient ranges with the idea of showing the quality of seeds marketed in the district. Incidentally details of variations between size of the holdings, variations as influenced by the time of harvest, the interval of storage between harvest and marketing are also studied in this report from market to market.

The total arrivals of groundnut kernels in all the five markets of Cuddalore, Tindivanam, Tirukoilur, Villupuram and Vridhachalam during the summer crop season of 1954 amounted to 3,96,076 bags. Out of these 3,245 random samples were drawn and analysed. Of these samples 3,182 were of ordinary spreading variety (Local Mauritius) and the remaining 63 of the bunch variety. Out of the total 45·9% were machine-shelled, 53·5% hand-beaten and 0·6% hand-shelled. Cuddalore accounted for 70% of its samples as hand-beaten, Vridachalam for 88·8%, Tindivanam and Villupuram for 40% each and Tirukoilur for 20%. Thus it is evident that hand-beating of groundnuts is more prevalent in Vridhachalam and Cuddalore than in the other three markets where machine decortication has become more popular. (Vide Statement I)

Variations in the size of the holdings do not differ very much from market to market and they are mostly within one acre range. 78·2% of

the lots comprising 2466 samples were marketed by owners who have cultivated lands to an extent of an acre and below, 14·7% of the lots comprising 466 samples by owners who cultivate between an acre and two and 6 3% or 193 samples by cultivators who own 2 to 5 acres of land.

Harvest of summer crop usually commences in May in the case of early-sown crop and it extends upto September with late-sown crops. Crops harvested between May and June are considered either very early or early; those that are harvested in July and August are normal an those harvested from September onwards are late or very late. Classifying by these standards, 30% of lots were harvested between May and June, 50% in the months of July—August and the balance of 20% after August. Late harvest of the crop had been brought about mainly on account of the pre-occupation of the ryots in the preparatory cultivation for dry crops as well as the paucity of labour in the districts.

The time-lag between harvest and marketing is very short in the majority of cases. This is due to the poor economical condition of the ryots as also to the dearth of space for storing the goods for longer periods. After drying consecutively for 3 or 4 days or on alternate days the pods were decorticated or shelled by beating with sticks and marked thereafter. Within two weeks after harvest 78% of the lots were marketed while 22% of the lots were marketed thereafter within a period of two months. Generally the period of sale does not exceed a month after harvest but in cases where the ryots do not entirely depend upon this crop for their income they wait and take advantage of the fluctuations in prices and postpone marketing to a date when prices are higher. The details of holdings, variations in harvesting etc. are shown in Statement II. In respect of moisture variations Statement III will show that in the majority of the cases it ranged between 2 and 4% and 4 and 6%. Well-dried lots are very rare and it represented only 3·3% of the samples analysed. A comparative study of this feature from market to market reveals that the percentage of moisture was at its minimum at Vridachalam and Tindivanam while it was at its maximum at Villupuram, Cuddalore and Tirukoilur. The average dryage were 6·32%, 3·30%, 5 66%, 3·88% and 6·73% in markets of Villupuram, Vridhachalam, Cuddalore, Tindivanam and Tirukoilur respectively. Again, in 38·54% of the lots, the moisture ranged between 1 and 4% while in 44·92% of the lots it ranged between 4 and 8 percent.

Foreign matter and other refractions: High proportions of damaged kernels were prevalent in the majority of the lots at Cuddalore, Villupuram and it varied between 2 and 10% in 72·7% of the samples at the former and in 51% of the samples at the latter. It was at its minimum at Vridhachalam, being only in 6% of the lots, while it was 41% at Tindivanam and 23% at Tirukoilur.

Foreign matter such as stones, dust and other impurities were within 4% in 94·8% of the samples. Nuts in shell were prevalent upto 10% in 95 5% of the samples, while broken splits ranged at 10% and 25% in 94·1% of the samples. Shrivelled kernels were in excess in the majority of the samples. High percentage of nooks were present at Cuddalore and Tirukoilur, while it was moderate at Vridhachalam and Villupuram and negligible af Tindivanam. All these different components when reduced to a common basis of refraction proportionate to the different classification provided in the All-India Standard form of contract show high variations from market to market. Vridhachalam and Tirukoilur recorded the lowest refractions, of 3·07%, 8·5% and 6·36% respectively.

The following observations can be made from the above processing details.

In Vridhachalam market samples contained a lesser percentage of foreign matter and other detracting components, with minimum moisture content in majority of the lots. In the markets of Cuddalore and Villupuram the samples were moist and also contained a high percentage of foreign matter and other refractive elements. Though Tindivanam recorded higher percentage of foreign matter and other components, it accounted for a low moisture content. Tirukoilur market accounted for higher percentage of moisture content, with less of foreign matter and other detracting elements.

The above observations are only broad indications, to draw attention to quality factors obtaining in the Regulated Markets of the Committee. The data requires closer scrutiny statistically, which the Committee hopes to undertake, as it becomes better equipped to handle the work.

Name of Marke	ınd beaten		Hand shelled and hand beaten		Average dryage	Average refraction reduced to a common basis
	of los	Quantity	No. of samples	Quantity		
Cuddalore		3,015	20	17	5·66	10·07
Tindivanam		471	..	..	3·86	8·51
Tirukoilur		560	..	..	6·93	3·91
Villupuram		1,208	..	..	6·32	6·35
Vridhachalam		1,913	..	..	3·30	3·07

Iarvest and Interval between harvest and Sale.

Name Ma	TION BETWEEN HARVESTING TIMES				INTERVAL BETWEEN HARVESTING AND MARKETING			
	Early lots	Nor-mal lots	Late lots	Very late lots	1 week and below	1 to 2 weeks	2 to 4 weeks	One month
Cuddalore	141	301	114	95	163	489	116	22
Tindivanam	104	259	87	35	103	273	25	..
Tirukoilur	138	192	102	64	240	400	62	..
Villupuram	54	204	216	60	196	322	106	..
Vridhachalam	109	340	120	30	Not more than a month.			

Name Ma	ıntity	Moisture between 8 & 10% Samples	Quantity	Above 10% Samples	Quantity	Average Dryage
Cuddalore	798	76	297	43	55	5·66
Tindivanam	155	5	19	2	6	3·86
Tirukoilur	481	85	304	86	225	6·98
Villupuram	747	73	338	21	82	6·32
Virdhachalam	34	13	38	10	14	3·30
Percentage in ϵ cation as aga number of sa		7·8	..	5·1	..	..

STATEMENT I.

Name of the Markets		Total No. of lots for the season	Total arrivals of quantity in bags	Total No. of samples analysed	Quantity representing samples in bags	Spreading variety		Bunch variety		Machine shelled		Hand beaten		Hand shelled and hand beaten		Average dryage	Average refraction reduced to a common basis
						No. of samples	Quantity	No. of samples	Quantity	No. of samples	Quantity	No. of samples	Quantity	No. of samples	Quantity		
Cuddalore	..	15,287	67,220	848	4,207	835	4,142	13	65	235	1,175	593	3,015	20	17	5·66	10·07
Tindivanam	..	19,904	62,001	391	1,170	379	1,134	12	36	234	699	157	471	..	..	3·86	8·51
Tirukoilur	..	12,693	53,599	702	2,243	687	2,198	15	45	561	1,683	141	560	..	..	6·93	3·91
Villupuram	..	35,807	1,73,909	648	2,760	638	2,710	10	50	388	1,552	260	1,208	..	..	6·32	6·35
Vridhachalam	..	13,440	49.349	656	2,146	643	2,104	13	42	73	233	583	1,913	..	..	3·50	3·07

STATEMENT II.

Classification of the Number of Samples and Quantity sold by growers accounted for according to the size of the holding and Time of Harvest and Interval between harvest and Sale.

Name of the Markets		Size of the Holdings.														Variation Between Harvesting Times					Interval Between Harvesting and Marketing			
		1 Acre and below		1 to 2 Acres		2 to 3 Acres		3 to 4 Acres		4 to 5 Acres		5 to 10 Acres		Above 10 Acres		Very early lots	Early lots	Normal lots	Late lots	Very late lots	1 week and below	1 to 2 weeks	2 to 4 weeks	One month
		Lots	Qty.	Lots	Qty.	Lots	Qty.	Lots	Qty.	Lots	Qty.	Lots	Qty.	Lots	Qty.									
Cuddalore	..	456	1,368	229	1,408	41	378	26	262	18	182	14	366	6	245	139	141	301	114	95	163	489	116	22
Tindivanam	..	344	771	35	243	..	..	10	100	..	..	2	56	..	..	7	104	259	87	35	103	273	25	..
Tirukoilur	..	640	1,495	25	384	20	223	17	141	..	..	..	..	..	..	186	138	192	102	64	240	400	62	..
Villupuram	..	514	1,542	85	970	20	148	4	61	..	..	..	..	1	39	90	54	204	216	60	196	322	106	..
Vridhachalam	..	512	1,580	92	286	30	163	12	117	..	..	..	..	..	..	66	100	340	120	30	Not more than a month.			

STATEMENT III.

Name of the Market		Total No. of Samples	Moisture below 1% Samples	Quantity	Moisture between 1 & 2% Samples	Quantity	Moisture between 2 & 4% Samples	Quantity	Moisture between 4 & 6% Samples	Quantity	Moisture between 6 & 8% Samples	Quantity	Moisture between 8 & 10% Samples	Quantity	Above 10% Samples	Quantity	Average Dryage
Cuddalore	..	848	10	78	55	165	185	584	317	1,229	162	1,798	76	297	43	55	5·66
Tindivanam	..	391	9	15	83	193	168	499	83	283	41	155	5	19	2	6	3·86
Tirukoilur	..	702	12	17	44	110	161	438	164	668	150	481	85	304	86	225	6·98
Villupuram	..	648	5	18	33	126	131	530	215	919	170	747	73	338	21	82	6·32
Virdhachalam	..	656	83	294	137	430	254	1,149	121	187	38	34	13	38	10	14	3·30
Percentage in each classification as against the total number of samples	..	..	3·42	..	10·84	..	27·7	..	27·7	..	17·22	..	7 8	..	5·1	..	..

STATEMENT IV.

(Showing number of samples in each category)

Name of the Market	Foreign matter such as stones and dust			Nuts in Shell		Damaged seeds				Splits		Broken		Nooks			Shrivelled		Total No. of samples
	4% and below	Above 4% upto 8%	Above 8%	Below 10%	Above 10%	2% and below	Above 2% upto 4%	Above 4% upto 10%	Above 10%	25% and below	Above 25%	10% and below	Above 10%	5% and below	Above 5% upto 10%	Above 10%	2% and below	Above 2%	
Cuddlore ..	797	43	8	788	60	131	233	301	183	724	124	773	75	519	239	90	200	648	848
Tindivanam ..	362	26	3	390	1	230	117	43	1	356	35	351	40	375	16	..	35	356	391
Tirukoilur ..	702	..	..	702	..	540	115	47	..	702	..	702	..	319	256	127	183	519	702
Villupuram ..	567	80	1	630	18	211	191	132	10	616	32	584	64	583	106	9	69	579	648
Virudhachalam ..	649	6	1	600	56	617	31	4	4	656	..	626	30	480	154	22	238	418	656
Total ..	3,077	155	13	3,110	135	1,729	687	527	198	3,054	191	3,036	209	2,276	771	248	725	2,520	3,245
Percentage ..	94·8	3·6	1·6	95·5	4·2	56·5	21·1	16·2	6·3	94·1	5·9	93·5	6·4	68·6	23·8	7·6	22·3	77·6	..

STATEMENT IV—B. Showing the number of bags in each category.

																			Total bags.
Cuddalore ..	3,950	215	42	3,685	522	423	917	1,787	1,080	3,506	701	3,877	330	2,807	958	442	825	3,382	4,207
Tindivanam ..	1,078	82	10	1,168	2	713	295	160	2	1,044	126	1,053	117	1,130	40	..	72	1,098	1,170
Tirukoilur ..	2,243	..	..	2,243	..	1,620	492	131	..	2,243	..	2,243	..	1,036	798	409	639	1,604	2,243
Villupuram ..	2,424	312	24	2,688	72	999	1,029	687	45	2,585	175	2,504	256	2,264	473	23	237	2,523	2,760
Virudhachalam ..	2,123	20	3	1,960	186	1,975	137	19	15	2,146	..	2,038	108	1,571	503	72	714	1,452	2,146
Total ..	11,818	629	79	11,744	782	5,730	2,870	2,784	1,142	11,524	1,002	11,715	811	8,808	2,772	946	2,487	10,039	12,524
Percentage ..	94·3	5·1	0·6	93·7	6·3	45·7	22·9	22·2	9·2	92·0	8·0	92·6	6·4	70·5	22·0	7·5	19·8	80·2	..

A Note on "The System of Sales of 'Supari' (Arecanut)" in the Mangalore Market

by

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Mangalore is the main assembling centre for arecanuts in South Kanara. Even the produce purchased by dealers in the interior places, is finally brought to Mangalore for sale to the shippers. Over 2,00,000 cwts. of "*Supari*" valued at over three crores of rupees is bought and sold at Mangalore, the sellers' commission alone paid on these sales amounting to over Rs 7,00,000 per year.

There are a number of commission agents at Mangalore who undertake to stock and arrange to sell these commodities. Regular transport lorry services are available to bring the produce from almost all parts of the district. The grower sends his produce through these transport lorries to his commission agent with necessary instructions for its sale. The commission agent receives the goods, stores it in safe custody in his godown, gives an advance of 70 to 80% of the value of the produce, if necessary, to the grower and then arranges for the sale of the produce. The sale is done as a secret bid under cloth cover, the bargaining being by secret code manipulations of the fingers of the commission agent. The highest bid is announced after each lot is sold and a rough record of the sales is maintained. This system of sale under cover of cloth is followed not only for the sale of arecanuts but for almost all the commodities in the Mangalore market.

The main defect of this system of secret sale is that the producer has to depend only on the commission agent for all his sales. There is no definite record to show the particular trend of bidding in a transaction. The grower will be kept completely in the dark as to details of bargaining, the final price only being given out to him.

In a regulated market, where a fair deal is to be ensured, this system of secret bid under the cover of cloth which gives room for suspicion and doubt, has no place at all and should be banned. An open system like the one done at the market yards of South Arcot district — the chit tender system — may usefully be introduced in all the regulated markets, so that the sales may be in a simple form intelligible to the growers of these crops.

Readers of the Madras Agricultural Journal may recall the article by Sri C. Raman Moosad on "The different modes of price fixation in regulated and unregulated markets" which appeared in this Journal, Vol. XLI, 1954. In the present article is explained the system of sale of *Supari* (Arecanuts) in Mangalore market. A few more such articles on the sales procedure in other markets and for commodities typical to them will be published in subsequent issues.

Editor, M. A. J.

THE MADRAS AGRICULTURAL JOURNAL

Hints to Contributors

The pages of the Madras Agricultural Journal shall be open ordinarily only to the members of the Madras Agricultural Students' Union.

All articles for publication should be addressed to the Editor, Madras Agricultural Journal, Lawley Road P. O , Coimbatore.

In view of the high cost of printing, contributions should be as concise as possible and should conform to the best usage in the leading Journals published in India and abroad.

Manuscripts should be typed with double spacing on one side of the paper only and with wide margin. They should not ordinarily exceed 5,000 words or 12 pages of printed matter including tables and illustrations in the Journal. Manuscripts should be carefully revised; numerical data and calculation checked. Main headings in the text should be typed in capitals with paragraph indentations and followed by a period and two hyphens. Sub-heads should be lower case and be underlined to indicate italics. Latin nomenclature and local terms etc., should be in italics Original papers must conclude with a summary of not more than 300 words, drawing attention to the main facts and conclusions.

Tables: The number of tables should be restricted to those absolutely necessary, as numerous tables detract from the readability of the article. Each table should be numbered consecutively from 1 up and must have a heading stating its contents clearly and concisely. The tables are to be typed on separate sheets with their positions marked in the text.

Illustrations: Wherever possible illustrations should be made with pen and Indian ink for reproduction as line blocks. The name of the author, title of the artitle and figure number should be written on the back of each figure in blacklead pencil. Each figure should have a legened typed on a separate sheet.

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The Madras Agricultural Journal

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Editorial

Scientific Jargon: Our readers can no doubt recall some of the oldtime favourites as subjects for school-boy debates, such as "Town Life or Country Life, which is better; Commerce or Agriculture, The Pen or the Sword, which is mightier". To these may be added the subject of "Scientific Jargon— whether it exists; if is does, whether it is necessary or not".

The term scientific jargon is at first sight somewhat paradoxical— because the dictionary meaning of jargon is "unintelligible words, gibberish" and gibberish can hardly ever be deemed to be scientific. All the same it is a fact that a certain type of specialised set of terms and expressions gets developed in certain specialised fields of knowledge. For instance in technical journals like Electronics or Chemical Engineering it is arguable that scientific jargon is appropriate so long as it is accepted in that particular field. It may even be desirable, when its use saves paper, time and energy in comprehending the facts communicated. In general however, it is rather difficult to explain what exactly is meant by "Scientific Jargon". In fact, there is no single diagnostic touchstone for it as such, because the acceptance or otherwise of any kind of jargon is determined mostly by usage, in which case it serves as a convenient vehicle for communication between experts. Without such a convenient medium for interchange of facts and knowledge, specialists might find communication as awkward and time-consuming as doing multiplication with Roman numerals. On the other hand compression should not be carried to the point of obscurity. The following examples will serve to show how overcrowding of technical terms obscures the meaning. "The pulverised fuel is gravity-fed to a point where it meets the forced draught through a twelve-armed spider rotating rapidly to break up lumps of coal that may have formed due to coal

particles adhering together. (Kapp, 1948)". Here are two examples from an agricultural report:— "The experiment was laid out in split-plot design in two sets, one with cumbu, cholam, ragi and groundnut in two seasons, the first crop season from September to December and the second crop season from December to March and the other with cotton in one continuous season from September to March." "Fisher's Z test was satisfied for kinds of legumes but it was not satisfied for phosphate treatments and interaction". One more example from the same book by Dr. Kapp typifies the "official jargon" rendering of of Mark Antony's famous speech. "In this case I have undertaken my journey here for the sole purpose of interring the deceased. From this point of view I do not propose putting anything on record is so far as praise of Caeser is concerned."

In agriculture, just as in all other sciences it is essential to put across facts and ideas in the most effective manner possible and to do this well, it needs a conscious effort and a certain amount of training to achieve an effective presentation of agriculturally technical information. It is obvious that in these days, almost every reader comes across far more written matter than he ever has time to read and hence the competition for his attention is very keen indeed. The scientists who neglect the basic principles of effective presentation, under a mistaken impression that such things are too trivial for their precious time and exalted attention, should recognise that the time of the reader too, is equally valuable to be wasted in digging out meanings from sentences buried in obscure technical jargon.

There is of course such a thing as scientific jargon which is by no means superfluous, but is very often useful and even necessary, but it should be kept well within bounds and used with discretion, so as to be intelligible to those who are not fully familiar with the subject matter. This is particularly necessary in the field of agricultural science, because at the receiving end the persons are invariably those who do not know much about specialised sciences, while at the transmitting end, each aspect is part of a specialised science in itself.

A New Angle on Trichy Phosphatic Nodules

by

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Introduction: Attempts have been made since 1892, both in this Institute and elsewhere, to convert the rich phosphatic material available as nodules in the Tiruchirapalli district of the Madras State into a readily available phosphatic fertilizer. The high content of lime (calcium carbonate) present in the raw material mitigated against its conversion into superphosphate by the usual sulphuric acid treatment. Consequently, the material, inspite of its high total P_2O_5 content (25 to 30%), remained unexploited for use as a fertilizer.

With the advancement of chemistry and technology, newer methods have been developed in recent years to convert rock phosphates into readily available phosphatic fertilizers without the use of sulphuric acid. The outcome of such developments have led in other countries to the production of phosphatic fertilizers by the following process:

(a) defluorinated phosphatic rock produced both by calcination and fusion (b) fertilizers produced by calcination of phosphatic rock with alkali salts (c) "phosphate rock-magnesium silicate glass" fertilizer produced by fusion with magnesia and silica and (d) fertilizers obtained by treatment of phosphate rock with nitric acid (Jacob, 1953).

Of the above products, the "Phosphate-rock-magnesium silicate glass' is prepared by fusing phosphate rock with olivine or serpentine rocks, which are inexpensive natural sources of magnesium and silica. This product has the following advantages over the other products:

i. No defluorination furnace or rotary kiln with its attendant refractory problems and fuel consumption is required;

ii. Olivine and serpentine rocks are readily available and cheap;

iii. Besides phosphorus, magnesium which is also a plant food, is present in this fertilizer and

iv. The product is similar to the silico-phosphate which does not undergo reversion in acid soils as is the case with superphosphate (Crowther and Lea, 1946; Mariakulandai, Venkatachalam and Rajagopal Iyengar, 1955)

Hence it was felt that the technique used in the preparation of "phosphate-rock-magnesium silicate glass" might serve the purpose of rendering the phosphorus in the Trichy phosphatic nodules available to plants.

Object: Accordingly, the process was studied under the following heads to arrive at the best technique and ingredient for rendering the P_2O_5 in the Trichy nodules available to plants:

(I) To study the effect of pure compounds of magnesium and silica in the fusion mixture.

(2) To study the possibility of using naturally occurring olivine and serpentine rocks of Salem, as cheap sources of magnesia and silica.

(3) To study the use of sulphates in improving the availability.

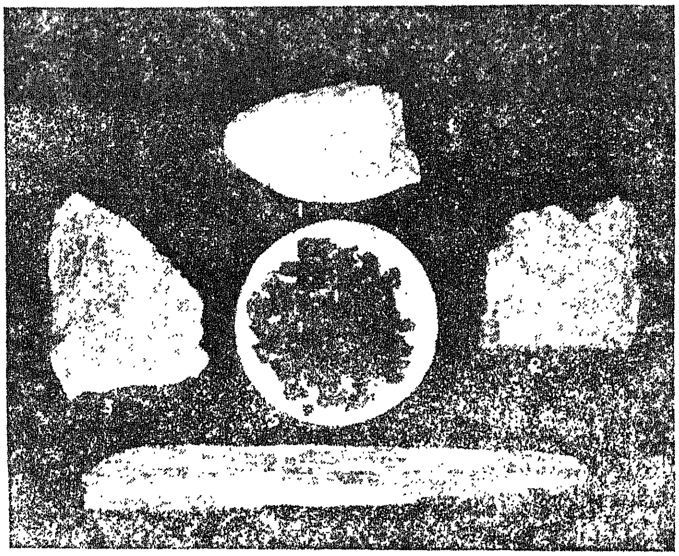
(4) To note the effect of quenching the fused mass in cold water.

A preliminary report of this work was published by the authors in Current Science (Mariakulandai *et al* 1955.)

Materials and Methods: Trichy phosphatic nodules giving a total P_2O_5 content of 28% were powdered to pass through a 50 mesh sieve and used. This material was mixed with a number of other chemicals like silicate, sulphates and carbonates of sodium, magnesium or calcium and also with materials like olivine and serpentine rocks obtained as by-products in the magnesite quarries of Salem, Madras State and bagasse ash obtained as waste in sugar factories. Bagasse ash used in this study was from the sugar factory at Pugalur in Trichy District. Plate 1 shows the raw materials used in this study with the fused product obtained from them.

About 100 grams of mixtures of the above materials were mixed in different proportions in a mortar using a little quantity of water and formed into small pellets of the size of a playing marble. These pellets were first air-dried and then dried in an oven at 150°C. The dried pellets had to be fused next. The fusion is usually done at a temperature of 1550°C in a three-phase

electric arc furnace in other countries (Moulton, 1949). As this facility was not available locally, oxy-acetylene flame was used (excepting for mixture No. 34 which was fused using graphite arc) for fusing the pellets prepared as above, one by one on a firebrick. The hot fused mass was then immediately quenched in cold water. All the mixtures presented in Tables 1 to 3 were quenched immediately after fusion.



1. Trichy nodule 2. Bagasse ash
3. Olivine 4. Serpentine
5. Fused Product

The fused product thus obtained was powdered to pass through a 90 mesh sieve and analysed for "total P_2O_5" and "available P_2O_5". "Total P_2O_5" was estimated volumetrically after precipitation as ammonium-phospho-molybdate, after extraction with 1:1 HCl to which a few ccs of HNO_3 was added while "available P_2O_5", which represents the form in which phosphorus is available to plants was estimated in the 2% citric acid extract of the material.

Raw materials used in the mixture, like olivine, serpentine and bagasse-ash, were analysed for their MgO and SiO_2 contents (Tables 5 & 6).

The results of analysis of the mixtures tried out are presented in Tables 1 to 4. From the data obtained, the following points emerge as answers to the problem under study.

(i) Presence of a silicate along with magnesia is better than either of them alone in the fusion mixture, in rendering the phosphate available in Trichy nodules (Table 1).

TABLE 1.

Showing the effect of fusing Trichy phosphate with pure compounds of magnesium and silica

S. No.	Mixture No.	Composition of mixture		Total P_2O_5%	Available P_2O_5%	% rendered soluble in 2% citric acid
1.	4	10 : 3	T. P : $MgCO_3$	29·33	2·83	9·65
2.	7	10 : 6	T. P : $MgSO_4$	29·57	4·83	16·33
3.	12	10 : 6	T. P : Na_2SiO_3	19·15	7·70	40·22
4.	5	10 : 3 : 3	T. P : Na_2SiO3 : $MgCO_3$	23·56	9·13	38·76
5.	6	10 : 3 : 3	T. P : Na_2SiO3 : $MgSO_4$	23·42	12·75	54·44

T. P :— Stands for Trichy phosphate

(ii) The naturally occurring olivine and serpentine rocks of Salem could be used as a source of silica and magnesia in the fusion mixture for rendering the P_2O_5 in the Trichy nodules available to plants. The bagasse-ash supplying mainly silica to the mixture was better than either of the two raw materia mentioned above when the latter are used alone in the mixture, without addition of other materials such as sodium sulphate (Table 2). In the presence of sodium sulphate, olivine and bagasse-ash mixtures are equal, while serpentine mixture is the best. (Table 3).

TABLE 2.

Showing the effect of fusion with raw materials containing magnesia and silica

S. No.	Mixture No.	Composition of mixture		Total P_2O_5%	Available P_2O_5%	% rendered soluble
1.	16	10 : 6	T. P : Olivine	19·68	5·66	28·76
2.	17	10 : 3	,, ,,	23·00	5·10	22·18
3.	18	10 : 3	,, Serpentine	24·68	6·55	26·55
4.	19	10 : 6	,, ,,	19·74	5·73	29·02
5.	20	10 : 3	,, Bagasse ash	19·80	9·74	49·19

(iii) Of the sulphates tried along with olivine and serpentine in the mixture, sodium sulphate was found to be the best, and sodium sulphate was necessary to get a 95% availability (Table 3).

TABLE 3.

Showing the effect of sulphates in improving the availability of phosphate in Trichy phosphate

S. No.	Mixture No.	Composition of mixture	Total P_2O_5%	Available P_2O_5%	% rendered soluble
1.	16	10 : 3 T. P : Olivine	23·00	5·10	22·18
2.	22	10 : 3 : 3 „ Olivine : $CaSO_4$	22·15	5·60	25·28
3.	26	10 : 3 : 3 „ „ : $MgSO_4$	22·35	10·15	45·19
4.	27	10 : 3 : 3 „ „ : Na_2SO_4	19·70	14·10	71·57
5.	18	10 : 3 „ Serpentine	24·68	5·10	22·18
6.	23	10 : 3 : 3 „ „ : $CaSO_4$	22·15	5·60	25·28
7.	34*	10 : 3 : 3 „ „ : Na_2SO_4	21·65	20·65	95·33
8.	20	10 : 3 T. P : Bagasse ash	19·80	9·74	49·19
9.	39	10 : 3 : 3 „ „ : Na_2SO_4	19·03	13·60	71·47

* Fusion done using the graphite arc at the Electrochemical Research Institute, Karaikudi.

(iv) As already observed by other workers, (Jacob 1953), fused product has to be quenched as it granulates the material for easier grinding and also prevents the reversion of the P_2O_5 to the unavailable form (Table 4).

TABLE 4.

Showing the effect of quenching the fused mass on the availability of phosphorus in Trichy phosphate

S. No.	Mixture No.	Composition of mixture	Total P_2O_5%	Available P_2O_5%	% rendered soluble
1.	2	10 : 3 : 3 T. P : $MgCO_3$: Na_2SiO_3 (Not quenched)	22·78	6·13	26·92
2.	5	10 : 3 : 3 T. P : „ Quenched	23·56	9·13	38·76

Discussion and Conclusions: Rendering phosphate rock available to plants through fusion has been tried by a number of workers. Waggaman and Esterwood (1927) have reviewed the conditions under which phosphate rock could be rendered citrate-soluble through calcination. The temperature range is a very important factor and is considered to be narrow for each type of salt and proportions tried (Guernsey and Yee, 1924). In the United States of America, mixtures of rock phosphate and olivine or serpentine are fused at

1550°C in a triple arc furnace and is estimated that with 850 kw. hr. of electricity and 15 to 20 pounds of graphite for the arc furnace, a ton of the product could be prepared on a commercial scale. In the present study, the objective was to render the phosphate in the Trichy nodules, citrate-soluble, so that the phosphorus in the nodules will be available to the plants. As a three-phase electric arc furnace was not available at this laboratory, the fusion was done with oxy-acetylene flame, the temperature of which was round about 1500°C in all cases reported in this study, barring mixture No. 34 which was fused in graphite arc at the Karaikudi Electro-chemical Research Institute at about 1500°C. The main objective of the experiment was directed towards finding out the best ingredients to be used, keeping the temperature factor as nearly constant as possible.

The use of silica and alkali salts such as KCl or K_2SO_4 has been found to be beneficial by Day (1895), in cases of phosphate rocks containing calcium carbonate. Wolter (1903) found alkaline earths and silicates to be good for the purpose, while Walthall and Bridger (1943) showed that fusion of phosphate rock with magnesia and silica gave a product with a high availability of phosphate. With Makatea phosphate of Japan, Ando and Kataoka (1952) report best results when mixed with Na_2SO_4, carbon and SiO_2.

This study has clearly brought out that of the pure chemicals tried in the mixture, magnesia or silica individually did not bestow as much benefit as would be obtained by a judicious mixture of both. Under the conditions of this experiment the best combination to render the phosphorus in Trichy nodules available to plants was 10 : 3 : 3 of Trichy nodules with $MgSO_4$ and sodium silicate respectively. But in any commercial venture of exploiting the process, the addition of pure chemicals would not be economical and in the search for such natural products to go into the mixture, a reference to literature indicated that Boylan (1953) found "langebeinite" containing K_2SO_4 and $MgSO_4$ to give 96% availability. Walthall and Bridger (1943) used olivine rock in the mixture with good results, Nagai *et al* (1951) in Japan found fusion of rock phosphate with serpentine and potassiun liparite in the ratio of 60 : 35 : 5, good. Huang (1953) has used both olivine and serpentine successfully in the fusion mixture. In the present study, olivine and serpentine rock samples obtained from Salem were used. These rock samples contained MgO and SiO_2 in good amounts (Table 5). But, it was found that the rocks by themselves could not give a

high availability of P_2O_5 without addition of sodium sulphate in the mixture (Table 3).

TABLE 5.

Showing the analysis of the olivine and serpentine rocks used in the study

		Olivine rock	Serpentine rock
SiO_2%	..	36·20	42·50
MgO%	..	47·61	42·72

Bagasse ash thrown out as a waste product from sugar factories and consisting mainly of silica (Table 6) with 2% P_2O_5 and a little lime was also useful in rendering the phosphorus in Trichy nodules available to the extent of 50%, when used alone with the Trichy nodules and to about 70% when used with sodium sulphate.

TABLE 6.

Showing the analysis of Bagasse ash used in the study

1. Insolubles (mainly silica)	..	94·19
2. Iron and alumina	..	2·31
3. Lime	..	1·91
4. Magnesia	..	trace
5. Potash	..	,,
6. Soda	..	,,
7. Sulphate	..	Nil
8. Phosphoric acid	..	2·23

Whatever be the mixture, quenching of the molten mass immediately in cold water gave a higher solubility and this is in keeping with the observation made by Jacob (1953).

From the above, it is evident therefore, that fusion at about 1500°C of the Trichy phosphatic nodules with the proper mixture followed by quenching in cold water would be a solution to the age-old problem of rendering the P_2O_5 in the Trichy nodules available to plants.

With the availability of cheap fuel and power at the lignite mines at Neiveli and the growing fertilizer consciousness in the country, the need for exploiting the natural phosphate resources has been keenly felt of late. The conversion of the phosphorus in the Trichy nodules to a useful form of fertiliser such as ammonium phosphate etc., is being studied. In this connection, it is felt

by the authors that the conversion of the nodules to the silico-phosphate form is likely to be cheaper than the conversion to ammonium phosphate. The latter involves multiple processing of the nodules viz., conversion of the phosphate in the nodules to elemental phosphorus, oxidation of the phosphorus so obtained to the oxide through thermal processing, hydration of the oxide to produce phosphoric acid and then again treating the acid with ammonia to be obtained through lignite, whereas the conversion to silico-phosphate involves only one step, of fusing the phosphate mixture at about 1500°C. Moreover, silico-phosphate is found to be the remedy for the problem of phosphate fixation in laterite soils of the Nilgiris and hence will be highly useful to the potato growers of the Nilgiris.

Summary: Work done as early as 1925 by Sivan *et al* had indicated that approximately 8 million tons phosphatic nodules containing nearly 25·6% of total P_2O_5 occur in Utatur village of Ariyalur Taluk in Trichy District. The phosphate in the nodules is in a form unavailable to plants due to its very low citrate solubility. The conversion to the commonly known useful form of fertilizer such as superphosphate was found to be uneconomical due to its high content of calcium carbonate.

Of the various techniques now available, the conversion to "phosphate rock-magnesium silicate glass" was adjudged as the best suited to avoid the use of acids for processing the material into an easily available plant food. The main objective of the study was towards finding out the most suitable mixture with magnesia and silica to obtain a highly citric-soluble fertilizer from the Trichy phosphatic nodule. To start with, pure salts of magnesia and silica were tried and it was found that 10 : 3 : 3 Trichy phosphate, magnesium sulphate and sodium silicate was the best. The next step was to attempt to substitute the pure salts with cheaply available raw material. Olivine and serpentine (from Salem) were used as sources of magnesia and silica. Though it has been reported by other workers that fusion of phosphate rock with olivine or serpentine gives the maximum solubility, yet in the case of Trichy phosphatic nodules it is seen that olivine or serpentine alone was not sufficient and that sodium sulphate is also necessary to bring about the maximum citric acid solubility. Quenching of the hot fusion product was also necessary to get the maximum solubility. Bagasse ash, a waste product from furnaces of sugar factories, which consists mainly of silica was also tried as a cheap source of silica and was

found to give a citric solubility of 50% only by itself and 71% availability when Na_2SO_4 was added to the mixture. 95% availability of the P_2O_5 was achieved in the case of mixture No. 34 consisting of 10 : 3 : 3 of Trichy Phosphatic nodules with serpentine and sodium sulphate fused in the graphite arc furnace.

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Manuring of Sugarcane in Malwa

by

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Introduction: Madhya Bharat is situated in the centre of the Indian Union extending over an area of 47,000 square miles. The central part of this State is called Malwa Plateau situated at a height of 1,200 to 1,800 ft. above sea level. It consists of black cotton soils varying in depths from 1 to 6 feet and receives an annual rainfall of about 30 inches. On account of its high moisture-retaining capacity, the main crops of wheat, cotton, groundnut and jowar (sorghum) etc., are grown under rainfed conditions while sugarcane and other garden crops are cultivated on irrigated lands. The total area under sugarcane is about 55 thousand acres representing about 14% of the irrigated area of the State. The yields of indigenous cane varieties were only 10 to 12 tons per acre, but as a result of evolution of improved hybrid canes developed at the Central Sugarcane Research Institute at Coimbatore, the yields have increased by about 200 to 400%, but still it is not equal to the other sugarcane-growing areas of the country such as U. P., Bihar and Madras etc.

The yields of the improved varieties can further be raised by the application of nitrogenous manures both organics and inorganics. Sethi in U. P., India, (1937) reported that there is a general consensus of experimental results to show that part of nitrogen should be given in the organic form particularly as castor or groundnut cake, which proved superior to bulky manures. Rege in Bombay, (1941) stated that since the application of ammonium sulphate alone deteriorates the quality of the juice, mixture of inorganic manures with organics like oilcakes was best for sugarcane. Carey and Robinson (1953) in British Guiana found that with dressings of 2, 4, 6 and 8 cwt. per acre of ammonium sulphate, the percentage of sucrose fell on an average by 0·01, 0·10, 0·23 and 0·51 respectively.

Since no such work on sugarcane was done in this part of the country, an experiment was started at the Institute of Plant Industry, Indore, in 1948-49. The bulky manures, farmyard manure and compost, were applied as basal doses while mixtures of ammonium sulphate, groundnut cake and ammonium sulphate and castor cake were applied as top dressings.

Experimental layout and results: The treatments consisted of F. Y. M. (0·5% N) and Farm Compost (1·0% N) applied as basal dressing at 50 lb. N per acre, and two mixtures of ammonium sulphate plus groundnut cake and ammonium sulphate plus castor cake applied as top dressing to supply 50, 100, 150 and 200 lb. N per acre, in two instalments, once at the time of planting and the other at earthing-up after about four months. The mixtures were made in such a way that half the quantity of nitrogen was from ammonium sulphate and the remaining half from groundnut or castor cakes. The variety of sugarcane used was Co. 419 which has been recommended as the most suitable for this tract. The treatments were in three replications in a simple randomised block design in each season.

For combined analysis, the plotwise yields have been converted in tons per acre and these are given in Table 1.

As a result of the statistical analysis, it was found that the differences in the cane yield obtained in different seasons were highly significant. The yields obtained during 1948 – 49 were significantly lower than those of 1950 – 51 or 1951 – 52.

There were no significant differences in the cane tonnage due to the two bulky manures applied before sowing or to the two manure mixtures being applied as top dressings.

With regard to the effect of various doses of nitrogen, it was found that the higher levels of 100, 150 and 200 lb. nitrogen per acre increased the yield significantly over control (50 lb. N per acre). However, there were no appreciable differences in their mean yields. The application of 200 lb. N gave a lower yield than 150 lb. N per acre, although it is not statistically significant, as will be seen from Table 2 given below.

TABLE 2.

Cane tonnage per acre

Levels of N.	Mixtures.	Ammonium sulphate groundnut cake.	Ammonium sulphate Castor cake.	Average.
50		25·16	22·98	24·07
100		28·78	27·41	28·09
150		28·91	28·78	28·84
200		28·02	27·91	27·96
Average		27·71	26·77	

Standard error for levels: 0·82 C. D. 2·37
Standard error for mixture: 0·58 Differences not significant.

Treatments	1951—1952			Grand Total	Average
	II	III	Total		
1. Farm Compost @	35·24	26·55	91·95	225·00	25·00
2. ,,	34·40	33·71	100·95	244·76	27·19
3. ,,	23·96	30·90	91·11	268·07	29·78
4. ,,	36·89	37·68	105·52	269·41	29·93
5. ,,	25·65	31 06	81·04	223 25	24·80
6. ,,	28·99	28 30	90·84	259·97	28·88
7. ,,	32·44	29·36	97·10	257·25	28·58
8. ,,	22·84	26·87	72·18	243 75	27·08
9. F. Y. M. @ 50 lb	30·32	34·08	92·33	227·91	25·32
10. ,,	33·60	33·02	102·02	272·99	30·33
11. ,,	25·44	29·89	91·16	252·40	28·04
12. ,,	31·06	22·68	76·58	235·00	26·11
13. ,,	22·47	27·19	69·45	190·40	21·16
14. ,,	34 87	30·74	93·01	233·60	25·95
15. ,,	28·88	26·98	83·58	260·83	28·98
16. ,,	34·29	34·56	88·67	258·65	28·74

AG = Mixt

AC = Mixt

	M. S. S.	Ratio
Blocks	5·03	..
Seasons	1,121·99	46·00 **
Levels	166·62	6·83 **
Mixtures	31·96	1·30
Basal dressings	24·74	1·01
Int. Levels ×	9·12	0·37
,, ,, ×	4·96	0·20
,, Mixtures ×	3·30	0·13
,, Level ×	64·29	2·63
,, Levels ×	57·45	2·35 *
Error	24·39	..

** Significant at

(÷) The sum of sqound to be significant.

Standard erro

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Standard error

TABLE I

Treatments	1948—1949				1950—1951				1951—1952				Grand Total	Average
	I	II	III	Total	I	II	III	Total	I	II	III	Total		
1. Farm Compost @ 50 lb. N + 50 lb. N (AG) ..	26·89	22·27	4·86	54·02	27·14	26·98	24 91	79·03	30·16	35·24	26·55	91·95	225·00	25·00
2. ,, ,, + 100 lb. N (AG) ..	14·66	25·19	17·82	57·67	29·15	31·85	25·60	86·60	32·38	34·40	33·71	100·95	244·76	27·19
3. ,, ,, + 150 lb. N (AG) ..	30·78	27·05	31·59	89·42	28·67	29·20	29·68	87·55	36·25	23·96	30·90	91·11	268·07	29·78
4. ,, ,, + 200 lb. N (AG) ..	26·00	23·89	20·25	70·14	34·50	31·48	27·77	93 75	30·95	36·89	37·68	105·52	269·41	29·93
5. ,, ,, + 50 lb. N (AC) ..	25·11	3·64	21·46	50·21	27·35	32·06	32·59	92·00	24·33	25·65	31 06	81·04	223 25	24·80
6. ,, ,, + 100 lb. N (AC) ..	29·48	25 27	24·70	79·45	31 22	30·85	27·61	89·68	33·55	28·99	28 30	90·84	259·97	28·88
7. ,, ,, + 150 lb. N (AC) ..	23·89	19·60	17·82	61·31	32·22	33·81	32·81	98·84	35·30	32·44	29·36	97·10	257·25	28·58
8. ,, ,, + 200 lb. N (AC) ..	25·11	25·11	24·30	74·52	33·34	33·39	30 32	97·05	22·47	22·84	26·87	72·18	243 75	27·08
9. F. Y. M. @ 50 lb. N + 50 lb. N (AG) ..	16·85	17·98	15·47	50·30	26·82	30·95	27·51	85·28	27·93	30·32	34·08	92·33	227·91	25·32
10. ,, + 100 lb. N (AG) ..	26·73	20·57	29·97	77·27	30·05	34·13	29·52	93·70	35·40	33·60	33·02	102·02	272·99	30·33
11. ,, + 150 lb. N (AG) ..	27·38	17 41	24·87	69·66	27·82	33·97	29·79	91·58	35·83	25·44	29·89	91·16	252·40	28·04
12. ,, + 200 lb. N (AG) ..	20·17	22·27	21·87	64·31	31·48	29·29	33·34	94·11	22·84	31·06	22·68	76·58	235·00	26·11
13. ,, + 50 lb. N (AC) ..	21·55	7·05	3·00	31·60	25·97	27·29	36·09	89·35	19·79	22·47	27·19	69·45	190·40	21·16
14. ,, + 100 lb. N (AC) ..	23·65	3·00	23·89	50 54	28·51	30·32	31·22	90·05	27·40	34 87	30·74	93·01	233·60	25·95
15. ,, + 150 lb. N (AC) ..	29·56	24·46	26·08	80·10	34·77	26·50	35·88	97·15	27·72	28·88	26·98	83·58	260·83	28·98
16. ,, + 200 lb. N (AC) ..	31·59	20 65	27·54	79·78	25·86	34·18	30·16	90·20	19·82	34·29	34·56	88·67	258·65	28·74

AG = Mixture of ammonium sulphate and groundnut cake.

AC = Mixture of ammonium sulphate and castor cake.

ANALYSIS OF VARIANCE

Due to	D. F.	S. S.	M. S. S.	Ratio
Blocks	6	30·17	5·03	..
Seasons	2	2,243·99	1,121·99	46·00 **
Levels	3	499 85	166·62	6·83 **
Mixtures	1	31·96	31·96	1·30
Basal dressings	1	24·74	24·74	1·01
Int. Levels × mixtures	3	27 37	9·12	0·37
,, ,, × basal dressings	3	14·90	4·96	0·20
,, Mixtures × basal dressings	1	3·30	3·30	0·13
,, Level × mixtures × basal dressings	3	192·88	64·29	2·63
,, Levels × Seasons	6	344·73	57·45	2·35 *
Error	114	2,780·72	24·39	..

** Significant at 1% level. * Significant at 5% level.

(÷) The sum of squares of interactions with seasons have been pooled with the error variance, except that with the levels which was found to be significant.

Standard error for seasons = 0·71 tons. C. D. = 2·05 tons.

,, ,, nitrogen levels = 0·82 tons. C. D. = 2·37 tons.

Standard error for mixtures or basal dressings = 0·58 C. D. = Not significant.

Standard error for inter-action — levels of N × seasons = 1·42 C. D. = 4·11 tons.

Interactions: The differential responses for various treatment combinations were not statistically significant except the interaction between the levels of nitrogen and the seasons, as will be observed from the figures given in table 3.

TABLE 3

Cane tonnage per acre

Levels of N.	Seasons.	1948—49.	1950—51.	1951—52.	Average.
50		15·51	28·80	27·90	24·07
100		22·07	30·00	32·20	28·09
150		25·04	31·26	30·24	28·84
200		24·06	31·26	28·58	27·96
Average		21·67	30·33	29·73	

Standard error for interaction: between levels of N and seasons 1·42 C. D. 4·11

It will be evident from the above figures that the levels of nitrogen responded differeently in each season and each level gave significantly lower yields in 1948 – 49 than in 1950 – 51 or 1951 – 52.

Response curves and optimal doses: The response curve helps a great deal to select the suitable levels of treatments in agronomical trials. The characteristic of a response curve is that it shows an upwards trend with an increase in the fertiliser dosage but the rate of increase declines for the higher doses.

In this paper the effect of graded doses of nitrogen on the cane tonnage has been shown by means of polynomical curves of the form $Y = a + bx + cx^2$ fitted to the observed mean values for three seasons, for both the mixtures Am. sulphate + groundnut cake (abreviated as AG) and Am. sulphate + castor cake (abreviated as, AG) and Am. sulphate + castor cake (abbreviated as AC) and Am. sulphate + castor cake (abbreviated as AC) and have been represented in Fig. 1.

The curve for mixture 'AG' shows that the response due to 100 lb. N per acre was the highest but it declined with the subsequent dose of 150 lb. N. A further fall in the curve was noted with the application of 200 lb. N indicating thereby that the maximum yields were reached at 150 lb. N and no further gains would be achieved by exceeding this limit under Malwa soil and climatic conditions.

The second curve drawn for mixture 'AC' showed that although the yields with this mixture are lower than that of mixture 'AG' it responded better so that at the highest level of 200 lb. N per acre, the yield was the same for both the mixtures i. e. the lower doses of mixture 'AG' proved more effective than the same doses of mixture 'AC', but the highest dose of the latter has a lesser depressing effect than the same dose of the former.

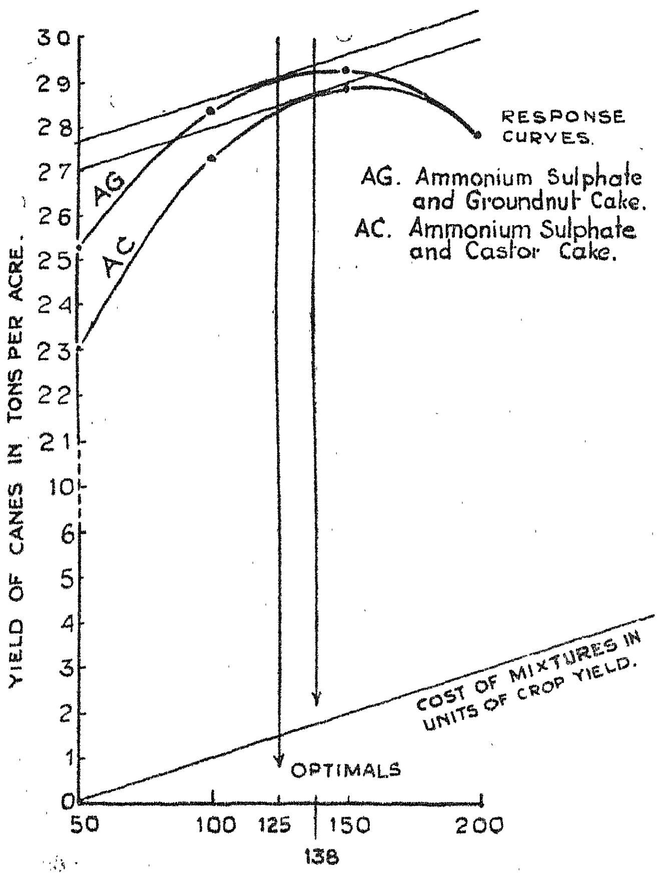

FIG. 1. RESPONSE CURVES SHOWING THE COST OF THE MIXTURES AND THE TANGENTS DETERMINING THE OPTIMAL DRESSINGS.

Normally the most desirable dose of the manure or the fertiliser is that which gives the maximum net profit to the grower and since the relative prices of the manures and the crop produce are apt to fluctuate from season to season, the most remunerative dose will also vary accordingly. Hence in order to make this dose somewhat stable, Finney (1953) suggested that if the cost of the

manure or the fertiliser is expressed in terms of the weight of the crop produce of equal value, the cost of any dressing may be represented by a straight line and the maximum profit will be obtained for the optimal dressing which can be determined by drawing a perpendicular to the horizontal axis from the point where a line parallel to the cost line is tangent to the curve, as has been shown in Fig. 1. Such optimal doses for the two mixtures Am. sulphate + groundnut cake and Am. sulphate + castor cake were found to be 125 lb. N and 138 lb. N per acre respectively. These optimals synchronised with the actual calculated values as will be seen from the Tables 4 and 5.

TABLE 4

Economics with the mixture, Ammonium sulphate and groundnut cake

Levels of N		Expected cane tonnage acre	Extra tonnage over control	Value of extra produce			Cost of manure mixture*			Profits (+) Loss (—)			
				Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	
Control	50	25·3	..	..			..			..			
	100	28·4	3·1	155	0	0	47	14	7	107	1	5	(+)
	(125)	29·1	3·8	190	0	0	71	13	10	118	2	2	(+)
	150	29·3	4·0	200	0	0	95	13	2	104	2	10	(+)
	200	27·9	2·6	130	0	0	143	11	9	13	11	9	(—)

TABLE 5

Economics with the mixture, Ammonium sulphate and castor cake

Control	50	23·0	..	..			..			..			
	100	27·3	4·3	215	0	0	47	14	7	167	1	5	(+)
	(138)	28·8	5·8	290	0	0	84	12	5	205	3	7	(+)
	150	28·9	5·9	295	0	0	95	13	2	199	2	10	(+)
	200	27·9	4·9	245	0	0	143	11	9	101	4	3	(+)

* Cost of additional manuring over the lowest dose of 50 lb. N per acre.
( ) Optimals found from the response curves in Fig. 1.

Prices (average of three seasons):

Ammonium sulphate (20% N)	..	Rs. 11—7—0 per maund (82 lb.)
Groundnut cake (7% N)	..	,, 7—0—0 per maund (,,)
Castor cake (5% N)	..	,, 5—0—0 per maund (,,)
Selling price of cane	..	,, 50—0—0 per ton.

Discussion: Amongst several agronomic practices that contribute to improving crop yields, manuring is the one major factor in sugarcane production. The evidence on the subject proves beyond doubt that for getting better yields of sugarcane the use of both organic and inorganic manures is indispensable. In the present investigation the effect of seasonal

variation was found to be significant, due mainly to lodging and the damage caused by rats during 1948—'49.

The two bulky manures, F. Y. M. and Farm Compost, or the two mixtures, Ammonium sulphate + groundnut cake and Ammonium sulphate + castor cake, did not show any significant variation in their responses. Similar results have been reported by Joshi (1953) from tht experiments conducted at Tharsa and Adhartal farms in Madhya Pradesh with different kinds of manures and oil cakes. The same conclusion has been drawn from the results obtained at Gorakhpur and Kalai in U. P.

With regard to the effect of levels of nitrogen, it was noted that the yield increased with an increase in the dosage of nitrogen upto 150 lb. N per acre, but the differences were significant only over control (50 lb. N per acre). A further increase to 200 lb. N per acre, though it gave a significantly higher tonnage over control, slightly depressed the yields as compared to the dose of 150 lb. N. This fact has also been noted at Shahjahanpur in U. P. and in Madras where higher doses above 200 lb. N per acre affected the cane tonnage as well as sucrose content.

The utility of any dose of manure or fertiliser depends upon the financial returns after allowing for its cost. There are three possible ways to find out the most economical dose of any manure. In the first the cost of manure is deducted from the value of the extra produce, based on the actual market prices. The optimal dose thus determined will vary from season to season. The second is based on the formnla $\frac{q}{p}$ suggested by Sukhatme (1941) where q is the cost per lb. of nitrogen and p the price per lb. of the produce. Here too, the ratio will change from season to season The third and most useful method has been suggested by Finney (1953) in which the cost of the manure, if exressed in terms of the weight of the crop produce of equal value, the variation in the optimal doses from season to season would be minimised and the optimum dose would be more or less stable.

Summary: In a manurial trial on sugarcane Co. 419, farm-yard manure and farm compost were applied as basal dressings at 50 lb. N per acre and the mixtures of Ammonium sulphate + groundnut cake and Ammonium sulphate+castor cake were applied in graded doses of nitrogen varying from 50 to 200 lb. per acre as top dressings in two instalments. For the expected yield values polynomial curve was fitted for each mixture and the optimal dose was found out by

drawing perpendicular to the base line from a point on each curve *where the tangent parallel to the cost line touches it. No non-zero* level was included and the profits were calculated over the minimum dose of 50 lbs. N usually used by the cultivators. The results did not indicate any marked differences in the cane tonnage with the application of either farmyard manure or farm compost.

The two manure mixtures, Ammonium sulphate + groundnut cake and Ammonium sulphate + castor cake did not show any significant variation in their responses.

The application of higher doses of 100, 150 and 200 lb. N increased the yield significantly over control (50 lb. N), but the maximum was obtained by the application of 150 lb. N per acre.

Wherever the economics of manuring is to be studied the method mentioned by Finney seems to be of great utility for stabilising the optimals. In this trial the optimals by this method for Ammonium sulphate + groundnut cake and Ammonium sulphate + castor cake were found to be 125 lbs. and 138 lb. N per acre respectively.

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Striking Features of Australian Sugar Economy

(Cane Prices Linked to Recovery)

As readers are aware, the Government of India has deputed a five-man Indian sugar delegation to Australia and Indonesia on a fact-finding mission. This step is said to be a preliminary to several concrete steps which the Government may decide to take soon for placing the sugar industry on a more solid and stable footing. The Government has done well to choose Australia and Indonesia for a study, for the sugar industry in these countries has achieved such remarkable progress that first-hand knowledge of the methods adopted by these countries for this achievement will be of immense benefit to India. Indonesia, for instance, has long been noted for high technological advances in sugar manufacture. The sugar industry in Australia has successfully tackled many problems, especially these relating to stabilisation of sugar output, marketing of sugar and cane, distribution of the sugar price between mills and farmers, and utilisation of byproducts. In as much as these are the very problems which have confronted the Indian sugar industry for a long time, it will be worthwhile analysing, in these pages the striking features of the Australian sugar economy.

Australia produces about a million tons of sugar every year, of which half is consumed within the country and the balance is exported. The *per capita* consumption of sugar is about 130 lb. which is nearly 90 lbs. more as compared with India. Queensland is the major seat of the sugar industry and accounts for 96 per cent of the total sugar output in Australia.

A striking feature of the Australian sugar industry's development is the system of Government erecting the mills and then gradually passing them on to the control of cane growers. There are at present 32 sugar mills in Queensland and three mills in New South Wales. The daily cane-crushing capacity of each of these mills ranges between 2,000 tons and 2,500 tons. Half of the sugar mills in Queensland are operated as growers' co-operative units, the remainder being owned by public or proprietory companies. All the mills purchase their cane from independent growers. Only in very few cases do the mill owners grow a substantial quantity of cane.

Sugarcane Farms: The sugarcane farms in Australia conform to the typical Australian pattern of one-man ownership and

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operation. Generally, a farm comprises 70 acres of land, of which 60 acres are cultivated. The 60 acres normally comprise 15 acres of plant cane, 30 acres of first and second ratoons, and 15 acres of fallow land under preparation for planting. Each farm is a self-contained unit, with family residence, farm buildings, farm implements and cane cutters' barracks. Owing to high labour wages, mechanisation of farm operations, with the exception of harvesting, has been developed very extensively on farms in Queensland. The per-acre field of sugarcane in Australia averages 25 tons, which compares very favourably with the all-India average of 13 tons. The quality of cane grown is also very superior, the average recovery percentage being as much as 14·33 — highest in the world — as against less than 10 in India. To a large extent, this pre-eminence, it is said, has been achieved through the system of quality payment which will be discussed later — and the development of varieties rich in sugar. To quote one report: "The grower endeavours to produce the best cane and the miller aims to extract the highest possible preparation of sugar contained in stalks".

The sugar industry in Australia is governed by the agreement signed by the Commonwealth Government and the Queensland Government. Under the agreement, the former has to protect the sugar industry through restriction on imports of sugar from abroad. On its part, the Queensland Government has undertaken to acquire all sugar produced from cane grown in Queensland and New South Wales, to make sugar and sugar products available throughout Australia at certain specified prices, and to control production of cane sugar. It has also accepted the responsibility for losses arising from export of surplus sugar. Further, it helps the Fruit Industry Sugar Concessions Committee by providing funds required for assisting the manufactured fruits industry.

Before the commencement of each sugar season (May–June), the Queensland Government issues a proclamation regarding payment of advances by the Sugar Board to the sugar mills when the latter deliver to the former their raw sugar production. The proclamation prescribes (a) tentative crop percentages of home consumption aud surplus sugar based on estimates of output and demand within the country, (b) interim prices for both categories, with provision for additional payments during the season, and (c) a minimum standard of quality for sugar that would be accepted by the Government at the declared price. At the end of the season (close of January), the position is reviewed and, if circumstances

warrant, an additional price is fixed at the end of May, when the Board is in a position to determine the precise percentages of the crop required for home consumption and surplus sugar, as well as the actual prices payable for the two divisions of the output.

The Sugar Board consists of two representatives of the Queensland Government including the Chairman, and millers' representative and a growers' representative. The Board functions for the Queensland Government in the acquisition of the State output and the purchase of New South Wales production and for the disposal of the sugar so required. For financing the acquisition of raw sugar, refining and marketing it within the country, the Board has appointed the Colonial Sugar Refining Company as its chief agent. The Company, besides owning seven raw sugar mills, operates five refineries and has big interests outside the sugar industry. The marketing of the export quota of raw sugar is handled directly by the Board. When all the sugar has been disposed of in the Australian and overseas markets, the Board decides the final price to be paid to the raw sugar mills.

Fixation of Cane Prices: A unique feature of the sugar policy followed in Australia is that the price of sugarcane is linked to the price of sugar realised by the mills. The price is paid to the growers on the basis of "commercial" cane sugar" contained in the cane supplied by him. In other words, the proceeds of sugar are divided between the mills and the cane growers, the individual growers receiving payment according to the sugar content in cane supplied by him. The payment is done under the authority of the Regulation of Sugarcane Prices Act 1915. The provisions of the Act are administered by a special organisation.

Under the aforesaid Act, local Cane Price Boards have been established for each mill. It is this Board which fixes the price or prices to be paid by the mill for cane during the ensuing season and determines other matters relating to supply of cane such as period of delivery, weighment, handling, payment of price etc. While fixing the price or prices, the local Board takes into account (1) quantity of sugarcane to be crushed in the mill (2) estimated sugar content of cane (3) cost of production of cane in the area assigned to the mill and cost of production of sugar in the mill (4) crushing capacity and efficiency of the mills (it has been provided in the Act that the price of sugarcane will not be lowered on account of mills being inefficiently worked or managed or not

possessing machinery of the best kind), (5) labour conditions under which cane is grown, harvested and delivered to the mill, (6) price of raw sugar realised by the mill and (7) any other local conditions. The award determines only an interim minimum price which does not exceed 60 per cent and in special cases 85 per cent of the estimated value of sugarcane. It will be interesting to note in this connection that sugarcane with less than 7 per cent recovery can be refused by the mill. As already indicated the price paid for sugarcane varies according to the recovery percentage and the price of raw sugar. The following table indicates the fixation of cane price by a local board during the 1954 sugar season:

Recovery per cent.	Price of cane per ton when raw sugar is £35 per ton.			Increase or decrease per £ 1 above or below £ 35 per ton.	
	£.	s.	d.	s.	d.
7	1	2	2·8	0	6·48
8	1	8	6·4	0	1·64
9	1	14	10·0	0	10·80
10	2	1	1·6	1	0·96
11	2	7	5·2	1	3·12
12	2	13	8·8	I	5·28
13	3	0	0·4	1	7·44
14	3	6	4·0	1	9·60
15	3	12	7·6	1	11·76
16	3	18	11·2	2	1·92
17	4	5	2·8	2	4·08
18	4	11	6·4	2	6·24

The local boards are also authorised to determine the area which every grower can cultivate with sugar-cane in any particular year. This is related to the "mill peaks" assigned to individual mills by the Central Board. The "farm peaks" may be fixed in terms of tonnage of cane to be harvested, or tonnage of sugar to be manufactured therefrom, or the area under cane to be harvested. The farm peak system has been instituted to effect some measure of crop control and stabilisation so as to avoid overproduction. Appeals against the decisions of the local boards lie with the Central Sugarcane Prices Board.

The general methods of sampling and analysis to be followed for determining the sugar-content in cane supplied to mills by

individual growers are laid down in the Regulation of Sugarcane Prices Act. Samples of cane from trucks and juice from the front roller of the first mill are taken for every 30 tons of cane crushed. The juice is analysed for its brix and polarisation and cane for its fibre content.

Cane Tester: In order to ensure that the grower is dealt with squarely by the mills, a Cane Tester is appointed at each mill by the Queensland Government. The Tester has to pass an examination prescribed by the Cane Testers Examination board. His salary is paid out of the Sugarcane Prices Eund. His duties are to see that the sugarcane is correctly weighed, that the cane and the juice are sampled and analysed correctly in accordance with the prescribed regulations, and that the determination of sugar content is made in accordance with the regulations and payment is made therefor in accordance with the award. He can order fresh sampling and analysis if he is satisfied that they have not been correctly performed by the factory staff. He can also make the determination himself and his results are final, He can use the laboratory apparatus and material of the mill as are necessary for the purpose. He also prepares weekly and annual manufacturing reports and furnishes them to the local and central boards. The cane growers are also free to appoint a person or persons to observe and check the weighing of sugarcane supplied by the growers to the mills. The expenditure incurred on the administration of the provisions of the Act is met from the Sugarcane Prices Fund. This is built by the mills depositing at the rate of one penny on every ton of sugarcane received by them. Half of the amount is borne by the growers and the other half by the mills.

The final value of raw sugar – both home consumption and export—govern the total sugar money available. The Sugar Board pays this amount to the mills which, in turn, pay to the cane growers according to quantity scales prescribed in the awards of local boards. The balance is the mills' share of the sugar sales, Over a number of years, the proportions received by the two sections have varied very little; the generally accepted division is approximately 30 per cent to mills and 70 per cent to growers.

It will be evident from the foregoing account that the sugar industry in Australia is subject to several controls. These controls are administered not by a bureaucratic machinery, as is the case in India, but by a democratic body. This, the Central Sugarcane

Prices Board, consists of a Judge of the Supreme Court, who is the Chairman, one elected representative each of cane growers and millowners, a qualified sugar technologist, and a person experienced in accountancy and audit. The Chairman of the Board has all the powers, jurisdiction and authority of a Judge of the Supreme Court. It is this Board which assigns the cane areas to mills from which they draw their cane supplies and hears appeals against awards of local boards. It is also determines the quantity of sugar manufactured by each mill in a particular year. This is done with due regard to the total tonnage estimated by the Sugar Board for Australian consumption and export, capacity of the assigned areas for growing cane, relative efficiencies of mills and growers to a reasonable extent, and employment of labour as economically as possible under fair and reasonable conditions. Further, the Board advises the Queensland Government on all matters relating to production and marketing of cane and payment of its price.

Research Notes

A species of *Pythium* parasitic on Rice in South India

During the month of February 1947, a case of wilting and rotting of paddy plants was reported from Athur in Salem district. Examination of the fields showed rice plants wilting in large patches here and there, the top leaves wllting first and then the lower leaves. Plants in advanced stages of wilting showed typical symptoms of water-soaking at the collar region and rotting of the root system. The causal organism was isolated into pure culture and found to be a species of *Pythium*. Inoculations were done with the culture of this fungus on healthy seedlings without much success, then and so further investigation was given up for the time being.

In the month of April 1948 similar symptoms were noticed in a number of experimental plants of Co. 13 variety in the Government Agricultural Chemist's qreen house. Many plants in the pots were found to be wilting, starting with the first leaf and ultimately the whole plant wilting and rotting. Again in 1953—'54 a number of paddy seedlings of Co. 13 and Co. 25 were found wilting in patches in the wetlands of the Central Farm, Coimbatore. During the same year a number of wilted specimens were received from the Trichinopoly district for examination. A species of *Pythium* isolated from the wilting plants. The description of the fungus is as follows.

Sporangia spherical to oval, terminal or inter-calary $14{\cdot}0\mu$ to $26{\cdot}0\mu$; average $19{\cdot}4\mu$ in diameter; germinating through germ tubes (conidia) or by producing zoospores, which are many in number. Hyphae branched, non-septate, septate in old cultures, hyaline $2{\cdot}67\mu$ to $5{\cdot}3\mu$; average $4{\cdot}01\mu$ in thickness. Oogonia smooth, spherical, measuring from $18{\cdot}0\mu$ to $26{\cdot}0\mu$; average $21{\cdot}12\mu$ with one to many antheridia. Oospores smooth, fairly thick-walled, aplerotic, measuring from $18{\cdot}0\mu$ to $28{\cdot}0\mu$ in diameter.

The above description of the fungus agrees with Middleton's and Mathew's description of *Pythium debaryanum*. *P. debaryanum* has been reported to be parasitic on rice in Hawaii; Carpenter (1919) and Philippine islands; Ramos (1926). Other species of *Pythium* that have been reported to be parasitic on rice are *P. monospermum* in Japan; Ito and Tokunaga (1933), *P.dissotocum* (syn. *P. oryzae* Ito and Tokunaga) in Japan: Ito and Tokunaga

(1933) and Darker (1940), *P. Gracile* in Japan: Ito and Tokunaga (1933), *P. graminicolum* in Hawaii, Parris (1940): *P. rostratum* in U. S. A.: Middleton, *P, nagaii* in Japan: Ito and Tokunaga, Darker (1940) and in U. S. A.: Edson and Wood (1937) and *P. echinocarpum* in Japan: Ito and Tokunaga, Darker (1940). The fungus isolated by the authors would appear, however to belong to the *Debaryanum* group .

The fungus does not form oospores in agar media or grated carrot agar. Produces sporangia freely when suspended in sterile water or flowing water. Oospores are formed sparingly when grown in sterilized bits of rice roots.

Inoculation experiments: Rice seedlings of Co. 13 variety (same as used by the Government Agricultural Chemist in his experiments) were grown in Buchner tubes containing 40 grams of sand moistened with 10.c.c. of Knop's solution and in 25.c.c. of Knop's solution alone. Before raising seedlings the tubes (with the sand and culture solution) were sterilised and half the number of tubes in each set namely sand and Knop's solution were inoculated with the pure culture of the fungus. Then the necks of the tubes were plugged and sown with sterilized seeds. The seedlings started showing signs of wilting even after 15 days and after 20 days many of the seedlings were dead in the inoculated tubes as shown in the table below. These were showing hyphae in the collar region and oospores and hyphae inside the root tissue. The same *Pythium* was re-isolated from these rotting collar region.

Treatments	Number of plants	Number of plants dead	Number of plants survived	% of infection
Sand inoculation	9	4	5	44·4
Knop's solution	15	14	1	99·3
Control (in sand)	10	nil	10	nil
Control (in Knop's solution)	9	nil	9	nil

Remedial measures: Drenching the soil with % Bordeaux mixture was found to have very effectively checked any further casualities of plants in the Government Agricultural Chemist's plots.

Summary: A species of *Pythium* parasitic on paddy plants was isolated and identified to be belonging to the *P. debaryanum* group. Inoculation of the pure culture of this fungus on rice

seedlings was positive and the fungus was reisolated from the plants. Drenching the soil with 1% Bordeaux mixture is able to control the disease in pots.

The authors are indebted to Sri. C. S. Krishnaswamy Ayyar, Retired Government Mycologist under whose guidance the work was done, for his valuable suggestions and encouragement in the work.

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Gleanings

Yield trial in cotton: In the programme of selection work relating to Sea Island Cotton in West Coast, for improving yield and ginning percentage and securing a type with optimum fibre length and fineness, to replace Egyptian types at present imported into the country, a main yield trial was conducted with new varieties Andrews, Westberry and with two reselections from Montserrat. Analysis of yield and quality characters of the varieties showed that Andrews gave 40 per cent higher yield of lint over the control Montserrat due to high ginning per cent of 34 and fibre properties also. It possessed the optimum length, fineness and maturity with 1·23″ mean fibre length, 1·26 × 10—6 gm. per cm. fibre weight, and maturity of 72 per cent. In micro-spinning tests, it was adjudged capable of spinning 80's, thus fulfilling the standards required to replace the imported Egyptians.

Nutritive Value of Prosopis Juliflora Pods: The pods of *Prosopis Juliflora* possess a high nutritive value, namely, 70, similar to that of any other concentrate food. They are rich in carbonaceous matter and have fair amounts of digestible nutrients like protein and fibre. The nutritive ratio too, is not very wide and hence its high usefulness to cattle as a balanced food. The calcium/phosphorus ratio also is not ill-balanced, thus increasing its food value. The pods do not show the presence of any cyanogenetic glucoside.

Nutrients.	Per cent on dry matter basis.	Digestibility co-efficient.	Per cent digestible nutrient.	Total digestible nutrients TDN.
Dry matter per cent ..	84·57	..	..	..
Crude portion	10·06	65	6·86	..
Ether extractives	4·26	48	2·45	..
Crude fibre	30·77	81	24·92	70·51
N. F. E.	50·33	66	33·22	..
Total Ash	4·59	..	..	..
Ca.	0·33	..	..	..
P.	0·23	..	..	..

When the pods are given in the dry or semi-dry condition preferably in a crushed state, cattle, sheep and goats relish them well without any adverse effect.

Insect pests of cotton: Cotton is subject to the attack of two or three kinds of scale insects and mealy bugs, which are found sometimes doing considerable damage to the crop. The form, structure and habits of these scale insects and mealy bugs attacking cotton and the control measures adopted for them are briefly mentioned below.

Scale Insects: Scale insects are bugs which are stationary and fixed to the plant surface. They are covered over by a scale-like protective cover secreted by the insect itself. In this position the insects fix their sucking tube into the plant tissue and feed on the plant sap. Among scale insects the following are found on cotton in South India.

The Black Scale *(Saissetia Nigra, N):* This is a well-known black scale found in many plants and shrubs. The adult insect has a hard scaly covering and is of deep reddish-brown or darkish colour and is oval or roundish in shape. This scale covers every portion of the plant and sucks up the plant sap. Each female scale lays hundreds of pinkish eggs which hatch as minute, active larvae and crawl about the infested plant and later on settle on the shoots and stems and suck up the sap. This scale sometimes becomes very bad on cotton and under such conditions the plant gets weakened and stunted in growth.

The Neem Mealy Scale *(Pulvinatia Maxima, G):* This is another scale insect which, though not so common as the black scale, has been noted occasionally attacking isolated plants in cotton areas. The adult insect is leathery and oval and when about to breed, the female insect deposits a long whitish egg sac covered with mealy or white waxy matter. The presence of this scale can be made out by the presence of these white egg-sacs. The damage done is similar to that caused by the black scale.

The Yellow Scale *(Gerococcus Hibisci, G):* This scale is occasionally found on cotton in Tirunelveli, North Arcot and Coimbatore. The mature insects are

protected by a fairly hard scale of golden yellow colour and hundreds of these cover the infested plants in patches and suck up the sap. The damage done is similar to that caused by other scales.

Mealy Bugs: These insects belong to the same group as scales and have more or less the same habits and life history. They are characterized by their bodies being covered over by white cottony or mealy secretion. Though most of the adult mealy bugs are also stationary in habits like scales, some of them are able to move slowly. These bugs generally cover up the tender shoots and stems of the plants and check the vigorous growth by sucking the sap. Among mealy bugs the following two are noted on cotton.

Psudococcus Virgatus, C: This is a common mealy bug found on many plants. The adult is a soft, white, small creature of about ¼ inch with numerous white filaments on the sides and two conspicuous tail-like threads at the tail end. Very often this mealy bug completely covers the leaves and shoots of the cotton plant which when looked from a distance appear as though white-washed with lime. When appearing in large numbers, these bugs cause stunted growth and weakening of the crop.

Pseudoccoccus Corymbatus, G: This is similar to *P. Virgatus,* having the same general characters and habits, but in detailed structure the adult differs and it can be distinguished from *P. Virgatus* by the absence of white filaments on the body and the tail-like threads at the tail end. Damage done to plants is similar to *P. Virgatus.* Isolated plants often suffer from the attacks of this mealy bug which often covers the shoots in white mealy masses.

Remedial measures for Scales and Mealy Bugs: The control measures against the scale and mealy bugs are on the same lines. All badly infested plants should be thoroughly pruned and all the prunings burnt. Those that are partially attacked may be sprayed with a contact poison like fish oil soap at 1 lb. in 6 gallons or crude oil emulsion at 1 lb. in 6 gallons. Experiments conducted at the Agricultural College and Research Institute, Coimbatore, on these mealy bugs and scales have shown that Folidol or Ekatox 20 sprays at 1 oz. in 6½ gallons are highly effective on both. The spraying should be done thoroughly so as to completely cover the shoots, stems and leaves of the plant. As these insecticides are very poisonous, great care should be taken in handling them. Preferably, the treatment may be done under departmental supervision. They can be safely used on cotton unlike vegetables or other edible crops. One or two rounds or sprayings at fortnightly intervals will completely control the insects. The cost of treatment works out to Rs. 6 per acre per treatment. Another advantage of spraying Folidol and Ekotox 20 is that these insecticides are effective on other cotton pests also like aphides, mites, jassids, boll-worms, etc.

World Record Rice Yield at Yenda: A 60 acre-rice crop at Yenda, on the Murrumbidgee irrigation area, has yielded four tons per acre — a world record for machine-harvested rice.

The Yenda crop was part of the recent 90,000 tons rice harvest in the Murrumbidgee irrigation area and the Wakool area. Average yields obtained established district records in both areas - at least 2·5 tons per acre in the M. I. A. and 2·2 tons per acre at Wakool.

Previous record for the M. I. A. was 2·35 tons per acre in 1951. Mr. D. E. Wallin, District Agronomist of the Department of Agriculture at Griffith said recently that the high yields could be atributed to a number of factors, including the operation of the pure seed scheme centred at Leeton and administered by the Department of Agriculture in conjunction with the Rice Marketing Board. More than 90 per cent of growers in the M. I. A. had used *Caloro* seed supplied under this scheme.

Another most important factor was the now widespread practice of using subterranean clover in a pasture phase in the rice rotation. This increased soil fertility to such an extent that application of sulphate of ammonia was no longer necessary to ensure good rice crops.

Weather had been ideal for maximum yields, and many farms had been redesigned on a true contour system which permitted better control of irrigation during rice growing. (The Agri. Gaz. N. S. W. July 1955, p. 344). [T. R. N.]

Weather Review — For the monthof September, 1955

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January	Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam)	4·3	— 0·4	30·8	South	Madurai	5·2	+ 0·5	20·0
	Tirurkuppam*	6·3	+ 0·2	31·9		Pamban	1·1	Nil	15·0
	Vellore	8·3	+ 1·4	27·7		Koilpatti*	2·2	+ 0·8	12·6
	Gudiyatham*	7·2	+ 3·9	24·7		Palayamcottai	0·8	— 0·4	10·3
						Ambasamudram*	3·1	+ 2·0	18·8
East Coast	Palur*	2·2	— 2·8	35·9	West Coast	Trivandrum	17·5	+13·0	58·5
	Tindivanam*	3·3	— 1·5	28·2		Fort Cochin	17·8	+10·1	116·9
	Cuddalore	1·1	— 4·1	34·9		Pattambi*	13·8	+ 7·4	80·3
	Nagapattinam	3·2	— 0·1	25·8		Kozhikode	25·2	+18·6	127·8
	Aduturai*	2·2	— 1·1	26·6		Taliparamba*	16·8	+ 6·5	122·5
	Pattukottai*	3·5	+ 0·6	19·8		Wynaad*	9·5	+ 2·8	64·0
Central	Salem	5·2	— 0·9	27·3		Nileshwar*	20·4	+ 7·1	163·7
	Coimbatore (A. M. O.)*	2·2	+ 0·8	13·0		Pilicode*	20·3	+ 9·2	136·5
	Coimbatore	2·1	+ 0·5	15·3		Mangalore	20·2	+10·8	137·1
	Tiruchirapalli	10·5	+ 6·5	26·5		Kankanady*	21·4	+ 9·6	137·6
					Hills	Kodaikanal	14·9	+ 7·6	53·2
						Coonoor*	8·2	+ 5·1	29·3
						Ootacamund*	7·8	+ 3·7	49·1
						Nanjanad*	8·0	+ 2·5	49·8

Note:— * Meteorological Stations of the Madras Agric. Dept.

A low pressure area was lying over Rajasthan and adjoining Madya Bharat on 1—9—1955, but this became less marked on the next day. A depression was forming over the head Bay of Bengal on 2—9—1955. This intensified into a cyclonic storm of small extent overnight, crossed the coast near Balasore on the morning of 3—9—1955 and moved west-northwest wards over central India as a depression, which weakened into a diffused low pressure area over Rajasthan on 7—9—1955. In the meanwhile, unsettled conditions were observed in the West Central and adjoining north-west Bay of Bengal on 6—9—1955, which concentrated to a shallow depression on the next day, centred about 150 miles east of Calingapatnam, and moved inland over south Orissa as a low upto north-east Madhya Pradesh, where it got filled up on 13—9—1955. An easterly wave moved into the south-east Arabian Sea across the extreme south peninsula on 13—9—1955. A depression formed over east Uttar Pradesh near Kanpur on 14—9—1955, moved eastwards and broke up over the Nepal-Himalayas on 16—9—1955. A trough of low pressure lay over the south Peninsula on 16—9—1955. Two days hence, another low pressure trough lay off the West Coast, causing strengthening of the monsoon in the Maldives-Comorin area. Unsettled conditions persisted for two days in the south-east Arabian Sea and these were accentuated by an easterly wave entering into the south-east Bay of Bengal on 20—9—1955. A well-marked low pressure area lay over east central Arabian Sea with its central region about 250 miles west of Mangalore on 21—9—1955. On the same day a trough of low pressure lay over the west central and adjoining north-west Bay of Bengal, which concentrated into a depression the same evening and crossed the Orissa coast. The depression passed through central and north India before breaking up over the Punjab, Kumaon hills on 26—9—1955. The low pressure area over the east central Arabian Sea weakened to a trough on 23—9—1955 and persisted there up the end of the month, causing strengthening of the monsoon along the West Coast, where widespread and locally heavy rains occurred. During this period, a trough of low pressure formed in the south Bay of Bengal on 25—9—1955. Yet another trough of low pressure extended from east Hyderabad to the west central Bay of Bengal on 27—9—1955 and 28—9—1955. Due to the movement

of an easterly wave, markedly unsettled conditions were observed in the east central Bay of Bengal on 29—9—1955. A cyclonic storm rapidly developed in the north Bay of Bengal on 30—9—1955, and centred about 100 miles east-south.east of Puri.

Along the West Coast widespread rainfall occurred during the first ten days and locally heavy rainfall during the last five days of the month. Thundershowers were fairly well distributed over Tamilnad.

The note-worthy rainfalls and the zonal rainfall in inches are furnished below:—

Noteworthy Rainfalls			**Zonal Rainfall**			
Date	Place	Rain-fall in inches	Name of Zone	Rainfall for the month	Departure from normal	Remarks
12/9/55	Vellore	3·3	North	6·3	+ 1·3	Above normal
13/9/55	Nanjanad	3·2	East Coast	2·6	— 1·5	Below normal
26/9/55	Trivandrum	4·6	Central	5·0	+ 1·7	Above normal
27/9/55	Kozhikode	7·1	South	2·5	+ 0 6	Just above normal
do.	Alleppey		West Coast	18·3	+ 9·5	Above normal
29/9/55	Fort Cochin	3·7	Hills	9·9	+ 4·7	Above normal
do.	Pilicode	4·0				
do.	Nileshwar	3·8				
do.	Pattambi	3·3				

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 12—10—1955.

C. B. M. & M. V. J.

Departmental Notifications

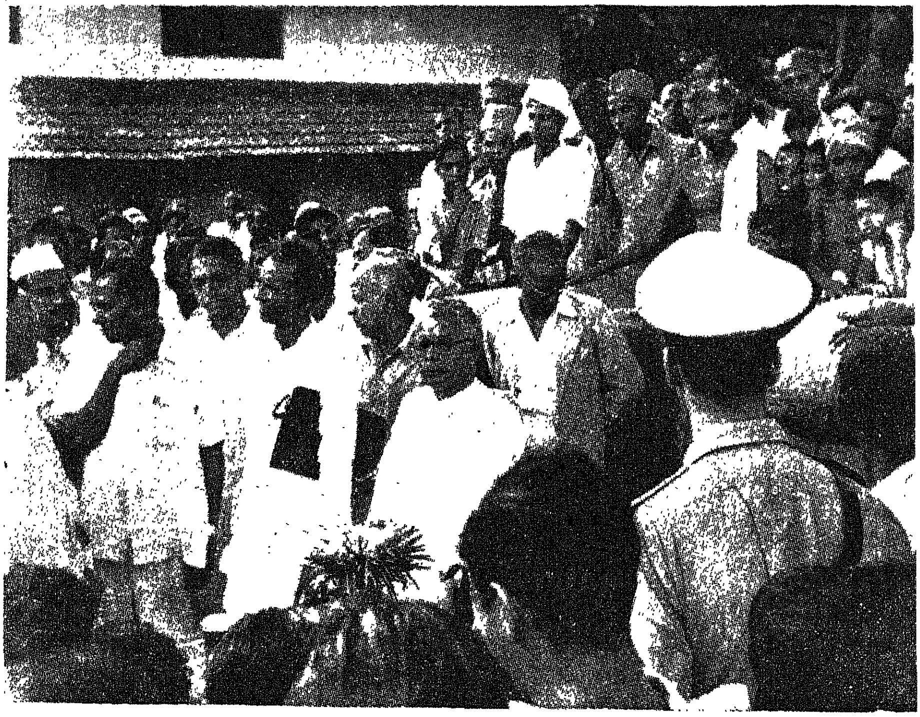
Gazetted Service—Postings and Transfers

Name and present post	Posted as
Mohd Obeidullah Shah, Dy. Director of Agriculture, Coimbatore,	State Marketing Officer, Madras.
Mariakulandai, Dr. A., Gazetted Asst. Lecturer in Chemistry, Coimbatore,	Government Agricultural Chemist, Coimbatore.
Satagopan V., State Marketing Officer, Madras,	Headquarters Dy. Director of Agriculture Inspection and General, Madras.
Varadachari K. Dy. Director of Agrl. Vellore,	Dy. Director of Agriculture, Coimbatore.
Varadarajan, S., Asst., in Chemistry, Coimbatore,	Agrl. Bacteriologist, Coimbatore.

Upper Subordinates

Name and present post	Posted as
Alagappan, R. M., Paddy Asst., Coimbatore,	A. D., Villupuram.
Annaswami, N., A. D., Varagoor,	P. P. A., Mycology, Pattukottai.
Balasubramaniam, C. R., Cotton Certification Inspector, Coimbatore,	Rajapalayam, to work in Lint Certification.
Dhandapani, A., Spl. A. D., Sugarcane, Gudiyattam,	Extension Officer, Krishnagiri.
Dinesh Rao, H., A. D., Palamedu,	A. D., Ramapuram.
Govinda Iyer, T. A., Asst., in Chemistry,	*Statistical* Asst., Coimbatore.
Johnson Thiruthuraraj, A. D., Karaiyur,	A. D., Thirumayam.
Kannan, S., A. D., Andhiyur,	F. M., Central Farm, Coimbatore.
Kuppuswami, V. N., Puduchatram	Instructor in Agrl., Grama Sevak Training Centre, Bhavanisagar.
Lakshmanan, S., F. M., Livestock Farm Orthanad,	Marketing Asst., Coimbatore.
Madhavachari, R., Marketing Asst., Coimbatore,	Marketing Asst., Madras.
Meenakshisundaram, D., Asst., Plant Physiology, Coimbatore.	Paddy Asst., Pattambi.
Mohd Sultan Mohideen, A. D., Mailam,	A. D., Poonamalli.
Nagarajan, N., A. D., Chingleput,	A. D., Vegetables, Madras.
Nagarajan, S. S., Asst., Groundnut Physiology,	Paddy Asst., Pattambi.

Name and present post	Posted as
Pranatharthiharan, S. N., A. D., Hosur,	F. M., Livestock Farm, Orthanad.
Ramachandran, S., Extension Officer, Sankarankoil,	Spl. A. D, Sugarcane, Gudiyattam.
Ramaswami, A. N., Asst., in Chemistry,	Asst., Plant Physiology, Coimbatore.
Ramachandran, P. K., Paddy Asst., Taliparamba,	F. M., Bhavanisagar.
Ramachandram Pillai,	P. P. A., Pattukottai.
Raghavan, K., Spl. A. D., Sriperumpudur,	Spl. A. D., Tirukalukundram Block.
Sivarama Rai, P., Coconut Asst., Nileshwar,	Entomology Asst., Kasargode.
Srirangaswami, S., A. D., Kodumudi,	Soil Conservation Asst., Satyamangalam.
Srinivasan, K. V., A. D., Tirukalukundram,	A. D., Jayankondan.
Subramaniam, T. N., A. D., Madukarai,	A. D., Andhiyur.
Subramaniam, P. T., Fruit Research Asst., Plant Physiology,	Pepper Asst., Taliparamba.
Shoukat Ali, K. A., Agrl. Instructor, Koilpatty,	P. A., to D. A. O., Salem.
Sethuraman, M. S., P. A., to D. A. O., Salem,	A. D., Hosur.
Sanjeevi, P. S., F. M., Kulitalai,	A. D., Milathur, Tanjore District.
Samu Iyer, P. V., Cane Asst., Palur,	A. D., Shembanarkoil.
Subramaniam, A., Millet Asst., Ariyalur,	Millet Asst., Coimbatore.
Thirumaleshwara Bhat, Myco. Asst., Vittal,	Extension Officer in Agri., Manjeshwar.
Tyagarajan, N. M., Asst., in Chemistry,	Asst. in Plant Physiology, Coimbatore.
Venkataswami, B., Extension Officer, Krishnagiri,	A. D., Cuddalore.
Vaidyanathan, R., A. D., Madurai,	Extension Officer, Perambalur.
Viswanathan, P. S., Food Asst. in Chemistry,	Cotton Asst., Coimbatore.
Velayudam, A. D., Jayankondan,	A. D., Palamedu.
Vinodini Vasudevan, Asst., in Millets,	Fruit Res. Asst., Plant Physiology, Coimbatore.
Vittal Hegde, F. M., Kulitalai,	Cane Asst., Palur.



Opening of the Regulated Market at Kuttippuram
by The Hon'ble Sri M. Bhaktavatsalam, Minister for Agriculture, Madras

The Minister cutting the ribbon to declare the Market Yard open

DISTRICTS
S. ARCOT; COIMBATORE
MALABAR; S KANARA
RAMANATHAPURAM
TIRUNELVELI
NORTH ARCOT

MARKET COMMITTEES CHRONICLE
DEVOTED TO A FACTUAL RECORD OF SERVICE FOR REGULATED MARKETING

CROPS
COTTON; GINGELLY
GROUNDNUT
COCONUT
ARECANUT
TOBACCO

MALABAR MARKET COMMITTEE

Opening of the First Regulated Market at Kuttippuram
by the Hon'ble Sri M. Bhaktavatsalam,
Minister for Agriculture, Madras

The First Regulated Market Yard of the Malabar Market Committe was opened by Sri M. Bhaktavatsalam, Minister for Agriculture, Government of Madras on 8th July 1955. A large gathering of growers and traders was present. Sri A. V. Govinda Menon presided.

In his speech welcoming the audience and the Minister, Sri P. B. Kurup, Chairman, Malabar Market Committee, said:

I have great pleasure to extend to you Sir, and all others who have kindly responded to our invitation and graced this occasion of the opening of the first Regulated Market in this District.

We are particularly grateful to you Sir, for having accepted our invitation to inaugurate this market in the midst of your various pressing engagements and multifarious activities.

We are also thankful to Mr. A. V. Govinda Menon who gladly accepted our invitation to preside over this function. Mr. A. V. Govinda Menon is familiar to you all through his various public activities and it would be superfluous on my part if I attempt to introduce him to you on this occasion. It is quite gratifying that the committee is having the willing co-operation of able and public-spirited men like Mr. Govinda Menon.

I would now like to place before you a brief outline of the activities of the Committee in its endeavour to realise the aims and objectives for which it was constituted.

The Madras Commercial Crops Markets Act enacted as early as 1933 for the better regulation of buying and selling of commercial crops, and the establishment of markets for them was made applicable to Malabar only in 1949. In a Gazette notification dated 5th May 1950, Malabar District was declared a notified area under the Act, and coconuts, copra and arecanuts were declared as notified commercial crops. This was followed by the nomination of 12 members to the Market Committee from among the important growers, traders, and a Government official as ex-officio member, with a Secretary as the executive officer of the Committee and the Committee started functioning from 26—10—1950.

A notice was published by the Committee Secretary requesting the traders, commission agents brokers and weighmen to take out licences and abide by the provisions of the Act. Despite the fact that this legislation was enacted for the benefit of the growers and traders of commercial crops, the Committee did not get the welcome it deserved from the prospective beneficiaries.

With the publication of the notice by the Secretary, there was considerable opposition from the traders, and attempts were openly made to violate the provisions of the act and rules, and paralyse the working of the Committee. Representations were made by the trade interests to Government through memoranda and otherwise, protesting against the establishment of the Committee. Efforts were also made even to misinterpret the Act to the growers.

But after discussions held between the trade interests and Government authorities and the sincere and earnest efforts of the Committee through persuation and vigorous propaganda, the misunderstanding of the implications of the Act, and the general misconceptions about the Committe and its objectives subsided to some extent and traders began to come forward to take out licences and abide by the act and its provisions. Although the opposition decreased to some extent it did not end. The authority of the Government to enact such a legislation was challenged at the Madras High Court under the fundamental rights guaranteed in the Constitution of India. Similar writ petitions from other districts where committees functioned were also on the files of the High Court.

A special bench of the High Court after hearing both sides passed judgment dismissing the petitions and upheld the act and rules declaring void only a section of the Act which gave the District Collector unlimited discretion to grant or refuse licenses under section 5. They partly declared void Rule 37 in so far as it prevented persons who are licensed but are not registered with the Committee, in carrying on trade in commercial crops. In their judgment, their lordships remarked that in a predominantly agricultural and backward country like India the need for such marketing legislation was all the more essential.

With this judgment of the High Court opposition almost faded out and the Committe was able to proceed in right earnest with its constructive activities.

One of the important functions of the Market Committee is to open regulated markets at important producing areas and existing assembling centres. Unfortunately, despite concerted efforts the Committee has not, been able to open markets at any of the important centres particularly in Kozhikode, Badagara and Ponnani already sanctioned by the Government due to paucity of suitable sites where trading is actually carried on at present. The Government had originally sanctioned the opening of a market for arecanut at Chalisseri but since a District Board shandy is functioning there, the original sancton was cancelled and the matter has been shelved for the present. With the continued efforts to open markets at Kozhikode and Badagara the Committee has now switched on its efforts to open as many regulated markets in the important interior centres where there will be no difficulty to find suitable places within the shortest possible period. In this connection the Committee has also formulated a Five-year plan in the course of which period it is proposed to open 22 regulated markets spread throughout the District.

It was only recently that the sanction has been accorded for the opening of regulated market for arecanuts at Kuttippuram and for coconuts and arecanuts at Thalakkadathur.

Kuttippuram, it is considered, is an ideal centre for a regulated market for arecanut. Situated as it is in the heart of the important arecanut growing area in South Malabar, the town which is a railhead has also sprung into prominence after the bridging of the Bharathapuzha (river) and the consequent easy accessibility from all parts of the district by road. A large number of arecanut curers in this district are also distributed within about 10 miles around the place. It is therefore a matter of gratification for the committee that it has been able to open a regulated market here and it is hoped that in course of time, this would develop to its full stature to serve the needs of the growers, curers and traders in arecanut in this area who have been groaning under various disadvantages in the past.

It is also hoped that within a short period the Committee would be able to open markets at Thalakkadathur and other centres and thus serve the needs of the district at large.

The Malabar Market Committee, when it was first constituted was a nominated one, and the present Committee which began functioning from 3rd March 1953 is the first elected Committee. The Committee has twelve members of which five are from growers, four from traders who are elected two members nominated by the Government and one ex-officio

member who is the District Agricultural Officer of this District. It is a noteworthy fact that one of our members is a lady, and that she happens to be the first lady to be a member of any market committee in this State.

This Committee is only four years old, but during the short period of its working it has been able to bring about an appreciable improvement in regulating the purchase sale of and coconuts, copra and arecanuts in this district.

Merchants, commission agent, brokers and weighmen have been licensed. The old practice of buyers taking various "Mamool deductions" in cash and kind from the sellers viz., sales tax (from the grower) charity, *Tukka*, cartage, *notuvattom*, *vattapasia*, *dallali paisa*, sorting charge, weighing charge, etc., in cash,and *Thandamuri*, *Kuttumuri*, *Varal* and *Thookatakka* (arecanut) etc., in kind, have been generally eliminated.

Commission charges, brokerage, weighing charges, and other incidental market charges have been clearly defined to the advantage of both the purchaser and the producers. Excessive and unwarranted charges are prohibited and market practices have been regulated. Units of weight have been standardised and weights and scales in use are checked with test weights for correctness. Issue of bills is also insisted upon.

Provision have alsr been made in the bylaws for settlement of disputes, for the prompt payment of the value of the produce by the buyer, and for collection of statistics of stocks and prices through periodical returns.

The financial position of the Committee is satisfactory at present. It is a matter of gratification that after meeting the usual items of expenditure, it has been able to save in all during the past four years more than Rs. 2 lakhs and invest them in National Plan Loan, Madras State Loan and other interest-bearing securities. The Committee may require about Rs. 50 lakhs or more for completing its five-year programme of opening 22 regulated markets in different centres of the district and providing all amenties and for which allotments from Central Arecanut nad Coconut Committees are expected. The Committee will also have to meet an equal portion of the allotment, which under the present circumstances will be beyond the means of the Committee. We request the State Government to come to the aid of the Committee in meeting this absolutely necessary expenditure.

The traders are in general abiding by the Act and rules, but unfortunately there were a few instances of persistent evasions and violations of the provisions and the Committee had to resort to the unpleasant task of prosecuting them. However, when such prosecuted parties come forward to take out licences and abide by the Act, the

complaints against them were withdrawn on levying a nominal sum by way of compounding fee.

I may take it that I have now placed before you a brief outline of the activities of the Committee so far.

As the elected Chairman of the Committee from its very inception in 1950, I consider it a great privilege to have had the opportunity to serve the growers and traders of this district. As Chairman of the Committee and personally, I have endeavoured to do my honest best to achieve the aims of objectives of the Committee. I should also mention here that Sri A. G. Kunhikrishnan Nair as Vice-Chairman of the Committee, has also rendered valuable services to the Committee. Despite strong differences of opinion among members it has always been possible to come to unanimous and amicable decisions and they as my colleagues, have always extended to me their unstinted co-operation in the discharge of my duties as Chairman of the Committee.

I will be failing in my duty if I do not speak about the efficient service rendered to the Committee by the Secretary, Sri Sivasankaran Menon. An honest and selfless officer himself, his varied experience in the Agricultural Department and his thorough knowledge of all agricultural aspects of this District has been of great assistances in taking the Committee ahead in its work. The fact that the staff of the Committee has also been very devoted to their work has also to be appreciated.

It is also gratifying to note that successive Directors of Agriculture, State Marketing Officers, and District Collectors have given valuable guidance and help to the Committee.

Finally, I have one request to make to the growers and traders of this District. However laudable the objectives of any legislation be, the willing co-operation of the public at large and particularly from its beneficiaries is necessary for the successful realisation of its objectives. I therefore request you all, and particularly the growers of commercial crops, to extend their wholehearted support and co-operation to the Committee to bring its efforts to fruition.

I once again welcome you, Sir Mr. President and all present here, and now request the Hon'ble Minister to inaugurate the Market.

Inaugurating the First Market Yard at Kuttippuram, Sri M. Bhaktavatsalam, Minister for Agriculture, Madras, said:

It gives me great pleasure to be in your midst to-day, to perform the opening ceremony of the first regulated market of the district to be established under the Marketing Legislation ot this State. I am thankful to Sri P. B. Kurup for having given me an opportuninty to be in your midst to-day and for addressing you all on the role of regulated markets.

A regulated market is a place for regulating the trade and other transactions in agricultural commodities. The producers, the traders and the consumers obtain the highest common measure of the benefits of such regulation. The actual methods are devised by the people themselves in a democratic way. For this purpose, a Market Committee composed of the representatives of both the growers and the traders is established. Statutory power is vested in such Committees to enforce the regulations. This in turn carries with it certain duties and responsibilities aiming at service to the people and the country.

The need for better marketing of agricultural produce has been felt acutely for a long time. Some of the advanced countries like the U .S. A. and U. K. have introduced their own marketing methods. Similar regulations are all the more necessary in an economically backward country like India and this fact has been stressed time and again by the various Committees set up by the Government of India and more particularly by the Royal Commission on Agriculture in 1928. This long-felt need has been fulfilled by the Madras Government passing the Madras Commercial Crops Markets Act, as early as 1933. It is in the fitness of things that the Planning Commission which has undertaken the huge task of improving the standard of living of the people has laid emphasis on the organised mrketing of agricultural produce. Though ultimately the marketing legislation has to be enforced in respect of almost all the agricultural commodities for which there are wholesale markets, it is now applied only in respect of the more important commercial crops of cotton, tobacco, groundnut, coconuts, arecanuts and gingelly. It is the aim of the Government to bring other commodities also gradually within the fold of regulated markets, and I hope that the people themselves will come forward with proposals in this regard.

It is admitted on all hands that the ryots as a class are economically backward and do not get their legitimate return. There is a tendency to squeeze from a weaker element a very much larger share of profit than what is due for the services rendered. Malpractices in weighment are not also uncommon. The growers are tempted with some advances and other kinds of assistance and are ultimately made to part with a good slice of the price of the commodities due to them. To remove these disadvantages, it is essential to regulate the trade in agricultural commodities. Regulation in marketing practices aims at having a hold over the persons who handle the produce in the course of its transmission from the producer to the producer to the consumer through a system of licences and to put down corrupt practices indulged in by unfair members in the trade. Illegal exactions are completely eliminated. At the same time the facilities provided outside the regulated markets will be complementary to those offered within such markets. A few persons holding an unbridled monopoly in trade with a desire to exact payments

or squeeze profits by unfair methods could alone object to this regulation as detrimental to the interests of the larger sections of the community. I am happy to observe that such opposition is yielding to a recognition of the benefits of regulated markets. There are still some misconceptions about the marketing legislation and they have to be removed by constant propaganda. There is no denying that reforms like regulation of trade in agricultural produce is essential and any opposition to such a measure cannot but be the worst type of social evil in a welfare State. My appeal to all of you is to help the Government and the Market Committees in fulfilling their duty by the people.

Regulated markets are working successfully in South Arcot district. These markets have become so popular that even growers from the neighbouring districts resort to these markets as the prices they are able to get there are higher than those in the unregulated markets nearer their homes. You are now starting one such market at Kuttippuram for the benefit of both the growers and the traders. This is but the forerunner of many more such markets in this district as elsewhere in this State. Arecanut, which will be the principal crop that will be regulated in this market is an important commercial crop in India and plays a very vital role in the economy of Malabar. Considering this factor, Malabar occupies a very enviable position in the production and trade of this commodity. It is now the proud privilege of the arecagrowers of Ponnani to have the first regulated market of the district in their place.

Let me hope that the people of Malabar will realise the benefits of regulated marketing and appreciate their role in the welfare of the ryots. With such a pious wish and with the blessings of Guruvayurappan, I have pleasure in declaring this market open.

Regulated Markets in Madras *

by

HON'BLE SRI M. BHAKTAVATSALAM
Minister for Agriculture, Madras

I am very happy to be in your midst to-day and preside over the Conference of the Chairmen of the Market Committees in this State. This is the first Conference which you have arranged after the separation of the Andhra State. This is also the first conference of the Chairmen of Market Committees which, I, as the Agriculture Minister of this State am called upon to preside over; the previous conferences in 1952 and 1953 having been held when my friend Dr. Nagan Gowda was in charge

* Presidential address of the Minister for Agriculture, delivered at the Conference of the Chairmen of Market Committees at Villupuram on 7—8—1955.

of Agriculture portfolio. I may state at once that Conferences like the one you have arranged now are essential as they serve as an occasion not only for exchange of views to review the progress so far achieved and and to prepare a plan for the future but also to discuss in a general way our difficulties and common problems confronting the Market Committees and devise means to get over them. It also affords an opportunity to spotlight to the public, the advantages accruing from the scheme of regulated markets.

Let me now deal in brief with the origin and development of of regulated markets in this country and particularly in this State. Some decades ago, it was noticed that the markets for commercial crops were in a disorganised state and that the cultivator laboured under many disabilities. The manipulation of the scales, weights and measures, unauthorised deductions from the price of the produce for religious and charitable purposes, the taking away of large-scale samples out of the cultivators' produce without any payment and the presence of brokers who were not always fair in their dealings with the growers, were some of difficulties which the illiterate farmer could neither understand nor overcome. It was in these circumstances that the Royal Commission recommended as early as 1928 the establishment of regulated markets for commercial crops under State Legislation. Hyderabad was the first to implement the recommendation of the Royal Commission and the first regulated market in this country was established at Nanded. Madras was not slow to move in this direction, as we also passed the Marketing Legislation in 1933. Similar legislation has since been passed in the States of Madhya Pradesh, Bombay, Mysore, Madhya Bharat, Pepsu and the Punjab.

The Commercial Crops Markets Act of this State was first applied to Tirupur in respect of cotton and the South Arcot District in respect of regulation of trade in one or more of the commercial crops of cotton, groundnut, gingelly, tobacco, coconut and arecanut. Fair and reasonable prices to the grower is as important as production itself and the absence of economical and efficient marketing facilities does not afford the farmer his legitimate return for all his labour. The marketing legislation ensures these facilities to the producer and guarantees a minimum price for his produce.

I shall now deal with the benefits of these regulated markets set up under the Marketing Legislation. This legislation provides for the appointment of market committees fully representative of the growers and traders. Market charges are clearly defined and unauthorised deductions are prohibited. The methods of sale, weighment, allowances, storage etc. are regularised. The traders, brokers, weighmen and other market functionaries are licensed. Correct weighment is assured by the

adoption of standard weights and measures. By-laws are framed for the regulation of business and conditions of trading in the market yards established by the Market Committees. The auctions conducted by the regulated markets have proved conducive to healthy conditions in which the grower is able to realise the just price for his produce and the trader his duty and responsibility towards the producer. The Market Committees publish the daily rates of the commercial crops they handle for the benefit of the growers and the trade.

Let me tell you that the scheme of regulated markets is slowly but steadily being extended in this State. But things have of late not been smooth with these regulated markets. The Government and the market committees had to face stiff opposition from the trade in certain parts of this State to the enforcement of the provisions of the Marketing Legislation. About two or three years back writ petitions were filed before the High Court by the members of the trade challenging the validity of the Marketing legislation of this State on the ground that it sought to impose restrictions on trade which were opposed to the provisions of the Constitution. The Marketing Act was upheld by the Madras High Court as a valid piece of legislation. But appeals to the Supreme Court are sought to be filed against the Madras High Court's Judgment. I shall leave the matter at this. I might state that the Government will always be prepared to consider any suggestions for the removal of defects in the Act or the rules and any hardships created by them.

Apart from the difficulties created by the attitude of a certain section of the trade, it is regrettable that in spite of the vast developments and progress made since Independence the ryots are still not completely free from some of the pitfalls inherent in their dealing directly with the trade in places where regulated markets have yet to be established. Marketing activities were dormant during the days of commodity controls as the marketing problems were not so pronounced in view of the scarcity of commodities on one hand and inflation on the other. There is now a surplus of almost all agricultural produce coupled with a steep fall in prices. Agricultural Marketing on scientific lines should be considered as necessary and useful in any rural economy. The solution now lies in an expansion of the regulated markets in order to guarantee a reasonable price to the grower. This is a difficult problem and has to be solved in the interests of the economic well-being of the ryots.

But even after more than two decades since the marketing legislation of this State has been passed, there is still a total misconception in the minds of some people about the objects of regulated markets. I wish to make it clear that the objects of the regulation envisaged under the Marketing Act is not to interfere with the trade or to control the price or tax the producer. It is not obligatory on the merchants to

buy in any particular place. Further, petty merchants who buy in small quantities are exempted from taking out licences under the Act and the grower need not pay any levy. It is unnecessary for me to explain the benefits of regulated markets in detail here. But I can assure you that the grower and the trader will derive a lot of advantages through these regulated markets, The need for better marketing of agricultural produce has been felt in advanced countries like the U. S. A. and England. "Marketing" is the last link of production affording the farmer an opportunity to realise the fruits of his labour. Marketing is the crux of the whole food and agriculture problem. I need hardly add that progress in this direction is all the more necessary in a country like India where most of the ryots are educationally and economically backward.

It is my hope that a network of regulated markets in all producing centres in this State would be established and that the day will not be far off when the objects of the regulated markets will be fully understood by the people.

The need for extending the benefits of regulated markets to all the important areas and crops has been stressed in the First Five-Year Plan. The number of regulated markets in the entire Indian Union has increased by 129 during the first Five-Year Plan period. To-day we have 412 regulated markets in the whole country spread over the States of Bombay, Madhya Pradesh, Madras, Mysore, Andhra, Punjab, Hyderabad, Madhya Bharat and Pepsu. These markets have become so popular that it is no wonder that the Spices Enquiry Committee set up by the Indian Council of Agricultural Research has suggested the establishment of regulated markets in respect of spices like pepper, cardamom, ginger, cashewnuts etc.

Regulation uuder the M. C. C. M· Act is only one aspect of marketing. The other aspect, viz., market news service, grading and standardisation, marketing surveys etc., are also equally necessary for orderly marketing of agricultural produce. The Government of India have under the Second Five-Year Plan recommended a few schemes being taken up under the Agricultural Marketing. There is also a proposal under the Second Five-Year Plan for the construction of warehouses. As warehousing facilities are very important for Market Committees the question whether the Government of India should render financial assistance to regulated markets in the shape of loans for construction of godowns, would naturally arise and I hope that any assistance which the Market Committees may require will have the backing of this Government. But the final decision in the matter rests with the Government of India. The objectives of organised marketing will be fulfilled only if the schemes for regulation under the Marketing Act and the schemes under the Second Five-Year Plan are implemented

simultaneously. I need hardly add that if the agriculturists and traders are to prosper, the development of regulated markets should precede development in other sectors.

I therefore appeal for the co-operation of the people in achieving the objectives of the Marketing legislation of this State and the implementation of the schemes under agricultural marketing that have to be taken under the Second Five-Year Plan. I also hope that the legal difficulties would before long clear themselves and the Government will be in a position to go ahead with their programme of development of regulated markets and agricultural marketing.

Gentlemen, I am afraid, I have spoken at some length but it has been necessary as I feel that the objects of regulated markets should be explained more fully and more clearly, so that the people themselves will take the initiative and come forward with proposals for the enforcement of the provisions of the marketing legislation. The existing channels of propaganda and publicity should be utilised to the utmost and new methods found out for educating each and every ryot on the benefits of regulated markets. The task is not so easy. But I do hope that constant propaganda would give the best results. I do not wish to take any more of your valuable time. I am happy that all of you are taking the keenest interest in the problems facing you and I find that your agenda contains many subjects of importance, such as doing away with the present system of elections to market committees, co-operation between market committees and Co-operative marketing Societies, extension of the benefits of regulated markets to all districts and to all important agricultural committees and so on. I have no hesitation in saying that you will consider all these problems deeply and in detail before coming to conclusions. I can assure you that the resolutions which you may pass in the conference will receive the most earnest and sympathetic consideration at the hands of the Government. I now request you to proceed with the deliberations and come to some useful and practical conclusions to enable the Government to implement the scheme of regulated markets fully.

Gentlemen, I wish your delibrations all success and I thank you once again for having given me this opportunity of meeting you.

Crop and Trade Reports

Mesta—First and Preliminary report 1955—'56—Madras State: The area sown with *mesta* in the Madras State upto 25th June 1955 is estimated at 860 acres. Compared with the area of 750 acres estimated for the corresponding period of last year, this is an increase of 14·7 per cent. An increase in area is estimated in the districts of Coimbatore, Tiruchirapalli and Tanjore. The area estimated was the same as that of the last year in North Arcot and Madurai districts. The area under *mesta* is little or negligible in Tirunelveli district. The yield per acre is expected to be normal in the districts of Coimbatore. Tiruchirapalli and Tanjore and slightly below the normal in the districts of North Arcot and Madurai.

The seasonal factor for the State as a whole works out to 99 per cent of the normal as against 98 per cent of the normal estimated for the corresponding period of last year. On this basic, the total yield works out to 1,610 bales of 400 lb. of dried fibre as against 1,380 bales of 400 lb. estimated for the previous year, representing an increase of 16·7 per cent.

Cotton—First forecast report—1955—'55—Madras State: The area sown with cotton in the Madras State upto 25th July 1955 is estimated at 74,500 acres. Compared with the area of 71,000 acres estimated for the corresponding period of previous year and an average area of 57,800 acres calculated for the previous five years ending with 1954—'55, this is an increase of 4·9 per cent and 28·9 per cent respectively. The area estimated is the same as that of last year in the districts of Malabar and South Kanara. A decrease in area is estimated in the district of Chingleput and an increase in the other districts of the State except the Nilgiris where the area under the crop is negligible.

The estimated area by varieties in the current year together with the corresponding figures for the previous year is given below:

Variety	Area in '00' acres	
	1955—'56	1954—'55
Madras American—Cambodia	203	238
Madras American—Cambodia—Uganda	150	93
Total ..	353	331
Karungannies	245	229
Tirunelvelies	81	138
Uppam	66	9
Nadam and Bourbon	..	3
Total ..	392	379
Grand Total ..	745	710

The average wholesale price of lint per maund of 82 2/7 lb. or 3,200 tolas on 6—8—1955 was Rs. 94—7—0 for Coimbatore Cambodia, Rs. 78—12—0 for Coimbatore Karunganni. Compared with the prices which prevailed on 7—8—1954, these prices reveal an increase of 2·0 percent in the case of Coimbatore Cambodia and a decrease of 4·0 percent in the case of Coimbatore Karunganni.

Ginger—first forecast report—1955-56—Madras State. The area under ginger crop upto 25th August 1955 in the districts of Madurai, Malabar, South Kanara and the Nilgiris is estimated at 13,030 acres. Compared with the area of

12,770 acres estimated for the corresponding period of the previous year, it shows an increase of 2·0 percent. An increase in area is estimated in the districts of Malabar, South Kanara and the Nilgiris and decrease in the district of Madurai. The condition of the crop is satisfactory and the yield per acre is expected to be normal in Malabar and South Kanara districts.

The wholesale price of dry ginger per standard maund of 82 2/7 lb. or 3,200 tolas on 3—9—1955 was Rs 117 at Kozhikode. Compared with the price for the corresponding period of last year i. e., 4—9—1954 it shows an increase of 66·7 percent.

Pspper—First forecast report—1955—'56—Madras State: The area under pepper upto 25th August 1955 in the districts of Malabar, South Kanara and the Nilgiris is estimated at 1,20,000 acres (1,02,360 acres in Malabar district, 17,490 acres in South Kanara district and 150 acres in the Nilgiris district) as against 1,16,610 acres (99,220 acres in Malabar district, 17,490 acres in South Kanara district and 150 acres in the Nilgiris district) as against 1,16,610 acres (99,220 acres in Malabar district, 17,240 acres in South Kanara district and 150 acres in the Nilgiris district) estimated for the corresponding period of the last year. The condition of the crop is reported to be normal in Malabar and South Kanara districts.

The wholesale price of pepper per maund of 82 2/7 lb. or 3,200 tolas on 3—9—1955 was Rs. 120—7—0 for Nadan and Vatakkan variety, Rs. 126—6—0 for Nadan and Vatakkan variety, Rs. 126—6—0 for Wynaad variety at Kozhikode, Rs. 122—11—0 at Cochin, Rs. 124—11—0 at Tellicherry and Rs. 121—4—0 at Mangalore. Compared with prices in the corresponding period of the previous year i. e. those which prevailed on 4—9—1954 these prices show a fall of 7·0 per cent for Nadan and Vatakkan variety, 6·5 per cent for Wynaad variety in Kozhikode, 22·3 per cent in Cochin, 12·3 per cent in Tellichery and 24·6 per cent in Mangalore.

THE MADRAS AGRICULTURAL JOURNAL

Hints to Contributors

The pages of the Madras Agricultural Journal shall be open ordinarily only to the members of the Madras Agricultural Students' Union.

All articles for publication should be addressed to the Editor, Madras Agricultural Journal, Lawley Road P. O., Coimbatore.

In view of the high cost of printing, contributions should be as concise as possible and should conform to the best usage in the leading Journals published in India and abroad.

Manuscripts should be typed with double spacing on one side of the paper only and with wide margin. They should not ordinarily exceed 5,000 words or 12 pages of printed matter including tables and illustrations in the Journal. Manuscripts should be carefully revised; numerical data and calculation checked. Main headings in the text should be typed in capitals with paragraph indentations and followed by a period and two hyphens. Sub-heads should be lower case and be underlined to indicate italics. Latin nomenclature and local terms etc., should be in italics. Original papers must conclude with a summary of not more than 300 words, drawing attention to the main facts and conclusions.

Tables: The number of tables should be restricted to those absolutely necessary, as numerous tables detract from the readability of the article. Each table should be numbered consecutively from 1 up and must have a heading stating its contents clearly and concisely. The tables are to be typed on separate sheets with their positions marked in the text.

Illustrations: Wherever possible illustrations should be made with pen and Indian ink for reproduction as line blocks. The name of the author, title of the artitle and figure number should be written on the back of each figure in blacklead pencil. Each figure should have a legend typed on a separate sheet.

Photographs: Photographs and wash drawings are more expensive as half-tone blocks are necessary. The cost of blocks is chargeable to the author of the article. Photographs submitted as illustrations should be unmounted, glossy prints of good quality, with strong contrasts, trimmed so as to include only the essential features to be illustrated. They should preferably be of the same size as desired in the printed paper. Photographs should always be packed flat, never rolled or folded.

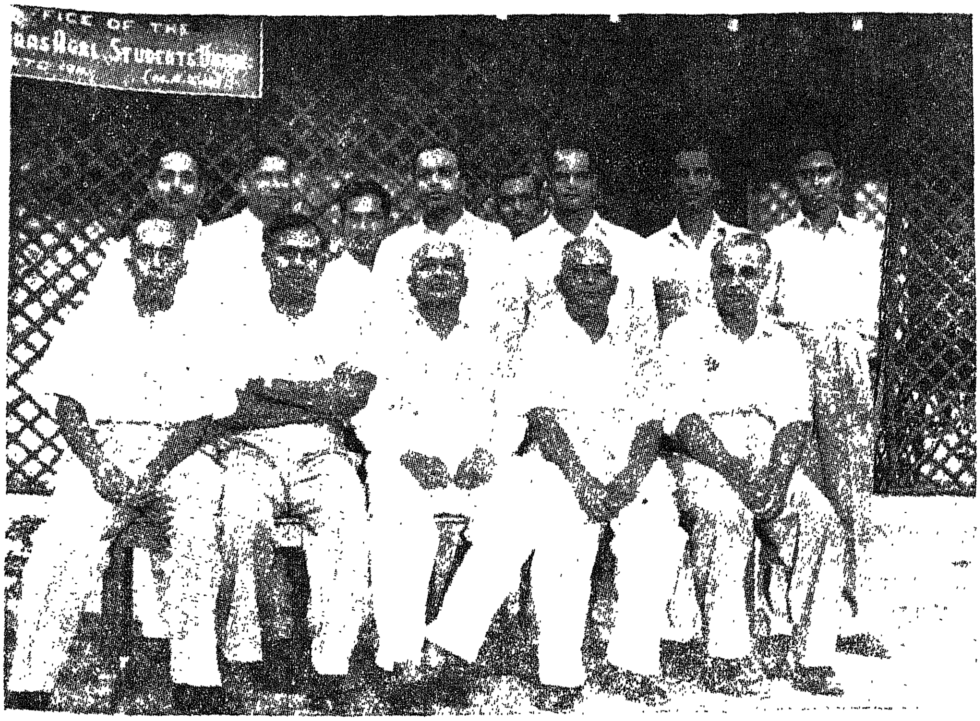
Line drawings: Line drawings, and charts should be prepared in twice the scale desired in the printed form. All letterings, figure numbers and explanatory notes in graphs should be light face and large enough to be 1/16″ high in the finished illustrations.

Graphs: Graphs should be drawn in Indian ink on co-ordinate paper ruled with blue lines. Any portion which is desired to appear in the reproduction should be drawn over with Indian ink.

References: References and reviews of literature should relate only to closely pertinent papers. The list of references should come at the end of the article, after the summary and should be arranged in alphabetical order of authors' names followed by the year of publication in brackets, and then the title of the paper, name of periodical volume number in bold face type and then the page number, *e. g.* Darlingtion C. D., (1944) Heredity, development and infection. *Nature*, **154**; 164–9. Abbreviations for names of journals are to be in the approved form as given in the World List of Periodicals.

The responsibility for statements, whether of fact or opinion, rests entirely with the author of the article and not with the Editorial Board of the Madras Agricultural Journal.

OFFICE-BEARERS OF THE MADRAS AGRICULTURAL STUDENTS' UNION FOR 1955—'56



Standing (Left to Right): Sri J. S. Rao, Sri S. G. Aiyadurai, Sri P. Madhava Menon, Sri K. S. Shetty, Sri G. A. Sivaraman, Sri A. H. S. Sarma, Sri P. C. Sahadevan, Sri B. Kandaswami Gounder.

Sitting (Left to Right): Sri T. R. Narayanan, Dr. A. Mariakulandai, Sri R. Balasubramania Ayyar (Principal), Sri C. R. Seshadri, Dr. N. Krishnaswamy.

The Madras Agricultural Journal

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Editorial

Scientific Research in India: This was the subject of the Thomas Holland Memorial Lecture delivered by Sir Alfred Egerton, F. R. S., on May 19th of this year. Sir Alfred was the Chairman of Egerton Committee which was recently assigned the task of reviewing the work of the National Research Laboratories and Institutes in India. The creation of this chain of National Laboratories in so short a time is a standing monument to the vision, drive and organising ability of the late Sir Shanti Swarup Bhatnagar. In the words of Sir Alfred Egerton, "much was no doubt started in India before it attained independence in 1947, including for example, the Board of Scientific and Industrial Research and subsequently the Council of Scientific and Industrial Research to administer the Industrial Research Fund, but all the same scientific research obtained its full recognition and encouragement only after 1947". The creation of nearly a dozen National Institutes within a short space of five years is no doubt a great achievement of which all Indians may well be rightfully proud, but as pointed out by Sir Alfred in the course of his lecture, these Institutes should be regarded not so much as an achievement in themselves as facilities provided for young Indian scientists to prove their mettle in the scientific field. He emphasised and rightly too, that fruitfulness of scientific research is first and foremost not a matter of money or equipment, but of outstanding men and women. The next sentence in Sir Alfred's address is worthy of very careful attention— "I have full faith in India's young scientists and technologists and I believe that with initiative and integrity, patience and persistence, they will do work in these institutes which will make them a worthy memorial to India's great public servant, Sir Shanti Bhatnagar".

Mark the words— "initiative and integrity, patience and persistence". As most of us would realise, the mere possession of an excellent instrument is no guarantee of excellent results. For instance, the mere possession of an expensive camera is seldom an assurance of beautiful photographs, nor will the possession of a genuine Stradivarius or Amati ensure the divine melodies of Yehudi Menuhin or Dwaram Venkataswami Naidu. In every field of human activity it is the man behind the instrument that is more important than the instrument itself and the newly created National research laboratories are no exception to this principle. Nor is this principle limited to the newly created institutes; even in our existing research institutes there is a real need to remember the basic truth that quality counts for much more than mere quantity and tangible results can be achieved only by sustained hard work, arising out of spontaneous enthusiasm.

The Soils of the Lower Bhavani Project Area and the Means of Improving their Fertility

(A contribution from the Chemistry Section, Agricultural Research Institute, Coimbatore)

Introduction: The Bhavanisagar Dam has now been completed and water has been let in to the fields for irrigation. To make the best use of the land it is necessary to have a correct idea of the soils of the Project area (Lower Bhavani Project area) and to grow only those crops which are best best suited to the soils.

The area commanded by the Project consists of a triangular strip of country lying along and to the south of the river Bhavani from the site of the dam upto Bhavani town where the river joins the Cauvery and along and to the west of this from Bhavani town down to Kodumudi. Portions of the taluks of Gobichettipalayam, Bhavani and Erode of Coimbatore district are included in the ayacut. The main soil of the tract is a shallow red soil, lateritic and porous. The rainfall in the tract is scanty and is inadequate even for dry crops like *Cumbu* and *Cholam* and the object of the Project is to ensure sufficient water for garden crops. Paddy and wet cultivation are to be discouraged, at least in the major portion of the ayacut.

In order to take stock of the different soil types and to formulate a comprehensive scheme of crop cultivation a soil survey of the Project area was undertaken in 1933—'34. During the traverse of the tract the following features were noted: (1) the surface features of the land, (2) soil-water conditions including drainage, (3) the texture and colour of the soil, (4) the depth and succession of soil horizons down to the parent rock and (5) the nature of the cropping and the natural vegetation in the tract. After the traverse, soil samples for detailed study in the laboratory were taken at spots roughly about three miles distant from each other.

The Physiography and Geology of the Tract: The commandable area is highly undulating, with numerous elevations and depressions and cut up at intervals by water courses. It is difficult to come across in the tract a level stretch of land a mile or more in length. The landscape all round presents a red and sandy appearance with

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This article includes the work of a number of workers in the Chemistry Section, of whom some have retired, while others are no longer alive, hence it is published now as a contribution from the section as a whole.

rocks jutting out here and there. There is not much of vegetation in the elevated places but the hollows and depressions are generally well covered with plants.

The general slope of the country is towards the rivers Bhavani and Cauvery. The shallow red soil, 9—18" in depth and lateritic in character is the predominant soil type of the tract. However, in the depressions between elevations are found deeper soils and this is especially the case where irrigated cultivation has been undertaken with wells. These soils are four feet and more in depth and are more fertile than the shallow red soil. The main soil type of the ayacut, namely the shallow red soil, is red to brown in colour and is often associated with considerable amounts of sand and gravel. A considerable quantity of quartzite pebbles, some of them as big as a human fist, is often found on the surface of the land in the area. These stones are gathered up by ryots into heaps and laid along the bunds of cultural areas to demarcate blocks. Where they are left on the field, it is probably due to the belief that they help in arresting soil erosion and in acting as a mulch to check loss of moisture.

The parent rock in the tract is the gneiss, massive and granitic in character, especially at the lower depths. The parent rock is generally struck at a depth of three to four feet. Between strata of gneiss, one or more veins of quartz are sometimes found. Embedded in these strata of gneiss and quartz are often large blocks of felspar.

The main soil type of the ayacut area is the shallow red soil ranging in depth from 9" to 27", the average being about 18". The profile characteristics of the soil in general may be described as as follows :—

0–17	inches	Red loam, often sandy or gravelly.
17–30	,,	Layer of broken quartz and crystalline felspar.
30–36	,,	Red silty loam.
36–45 (48)	,,	Weathered friable rock.
More than 45 (48)	,,	Hard parent rock, mostly gneiss.

The study of the soil profile together with the topographical and climatic features of the tract gives an insight into the pedogenic processes of soil formation. The quartzite nature of the parent rock and the limited rainfall has produced a shallow soil. The

undulating topography has entailed a large run off-and the porous character of the surface soil has allowed considerable leaching to take place, leaving behind a lateritic matrix rich in sesquioxides and poor in bases. The finer particles carried away in the surface run-off have been deposited in the depressions, giving rise to deeper and more fertile soils.

General character of the Soils of the Lower Bhavani Project Area: The samples collected during the traverse and soil survey of the Lower Bhavani Project area may be divided into two classes.

(1) The shallow red soil from the drylands comprising the major portion of the tract and

(2) The garden-land soils in the depressions between elevations.

The soil samples were studied in the laboratory for the following:

(a) Mechanical composition.

(b) Water relationships of the soil comprising the determination of the water-holding capacity, and pore space,

(c) Fertility status and base exchange properties.

(i) *The Dryland soils.* **Mechanical Composition:** All the samples of soil from the major portion of the commandable area, namely the drylands with shallow red soil were analysed for mechanical composition by a rapid conventional method. In this method the coarser fractions only were estimated by sieving and the finer fractions were obtained by difference. The preliminary treatment to break up soil aggregates consisted of boiling the soil (passed through a 2 mm. round-hole sieve) with water for half-an-hour. The rapid conventional method was adopted in the laboratory in order to complete in a short time, the analysis of the large number of soil samples collected during the survey.

The results obtained indicate the extremely coarse character of the soil. The average clay content is only about 5%, with about 9% of silt and 85% of sand. The clay content is in many cases lower than the average and only in two pits was the surface soil found to contain more than 10% of clay.

The mechanical composition as carried out by the International method on the dryland soils of the Agricultural Research Station, Satyamangalam is given below.

Mechanical composition of dryland soil, Satyamangalam
(INTERNATIONAL METHOD)

		0 — 9″	9″ — 18″	18″ — 27″
Clay %	...	20·85	24·34	20·31
Silt %	...	2·36	3·75	5·08
Fine Sand %	...	19·50	16·37	14·29
Coarse Sand %	...	58·35	53·78	54·19
Acid Solubles %	...	—	1·76	6·13
Total	...	101·06	100·00	100·00

Even those soils which have been in cultivation for several years can be classed only as sandy loams, with a preponderance of the coarser fractions, especially coarse sand. The dryland soils of the ayacut are therefore coarse and porous.

Water-holding Capacity: The water-holding capacity of the soils is low, the average value being about 26%, with the highest figure for any of the soils being about 35%.

The values given above were obtained in the laboratory for columns of prepared soil one centimeter in depth. In the field where the soil is deeper and of varying texture and compactness the capacity to hold water would tend to be lower. This is borne out by a separate series of experiments with columns of soil 9 inches deep. The average water-holding capacity for such columns was found to be only 20·6%; with the soil *in situ* the water-holding capacity may be reckoned at 15—16%.

The low water-holding capacity of the soils is due to their porous nature with a low percentage of the finer soil particles and organic matter. Water added to the soils would not be retained and would be lost by percolation and drainage. The water-holding capacity can be increased only by the incorporation of bulky organic manures.

Pore Space: The pore space in a soil is the space between the soil particles. It is of two kinds: (1) the bigger or macro-pore

spaces between the coarser individual soil particles and between the soil crumbs and (2) the smaller or micro-pore spaces between the very fine soil particles and within the soil crumbs. The macro-pore spaces serve as channels for the movement of water and air within the soil, while the micro-spaces are useful for the retention of added water. As the clay and organic matter contents are small there are very few crumbs and a very small percentage of micro-pore spaces in the dryland soils. The average value of 38% of pore space obtained for these soils consists mainly of macro-spaces and water movement in the soils will be rapid.

Fertility Status: The following table gives the results of the chemical analysis of the three depths of a typical dryland soil.

CHEMICALS ANALYSIS OF DRYLAND SOIL (DRY BASIS)

		0 — 9″	9″ — 18″	18″ — 27″
1.	Moisture % ...	2·17	2·74	2·56
2.	Loss on ignition % ...	2·08	2·26	1·73
3.	Lime (CaO) % ...	0·54	0·18	0·36
4.	Phosphoric acid (P_2O_5) % ...	0·045	0·024	0 023
5.	Potash (K_2O) % ...	0·29	0·22	0·19
6.	Total Nitrogen (N) % ...	0·038	0·038	0·027
7.	Organic carbon % (Walkley and Black number) ...	0·19	0·17	0·13
8.	Available phosphoric acid (P_2O_5) % ...	0·0017	0·0035	Trace
9.	Available Potash (K_2O) % ...	0·0028	0·0055	0·0032
10.	Total soluble salts % ...	0 038	0·033	0·040
11.	pH ...	7·51	7·60	7·80

The soil in all the three depths has a low fertility status. They are deficient in nitrogen, available phosphoric acid and potash. The soil does not contain adequate amounts of lime and other bases. Organic matter is in short supply. The soils contain only a small amount of water-soluble salts.

The soils have low to medium base exchange capacity and more than 50% of the bases are made up of calcium. Magnesium is the next important exchangeable cation followed by sodium. The monovalent cation forms 20—25% of the exchangeable bases and efforts

should be made to decrease the degree of alkalinisation if the soils are not to become bad. The results of the base exchange studies are given below:

BASE EXCHANGE STUDIES OF THE DRYLAND SOILS.

	0″ — 9″	9″ — 18″	18″ — 27″
	(In milli-equivalents)		
Exchangeable Calcium ...	5·00	7·50	7·40
„ Magnesium ...	0·02	1·76	2·47
„ Sodium ...	1·60	2·25	1·62
„ Potasium ...	0·75	0·74	0·74
Cation Exchange Capacity...	9 8	12·3	12·3

(ii) *Soils of the Garden-Lands:* The garden-lands are generally, though not always, situated in the low-lying areas between elevated places. As a consequence fine particles have been carried down from above and deposited in these places. These depressions are more fertile and conserve moisture better. So they have been under cultivation for hundreds of years. The soils of the garden lands contain a higher percentage of the finer fractions than the dryland soils. The average value of the finer fractions in the garden soils is about 24·6% compared with about 14% in drylands. The average water-holding capacity of the garden-land soils is about 34% compared with 26% for the drylands. The garden-land soils are generally 3 to 4 feet and more deep. The mechanical and chemical composition, and the base exchange properties of a typical garden land soil are tabulated below:

Mechanical composition of a typical garden-land soil.

	0 — 1 ft.	1 — 2 ft.	2 — 3 ft.
Clay % ...	33·78	28·55	17·97
Silt % ...	6·51	6·38	3·25
Fine Sand % ...	15·86	14·30	11·88
Coarse Sand % ...	45·67	53·59	67·56
Acid Solubles % (By difference) ...	—	—	—
Total % ...	101·82	102·82	100·66

CHEMICAL ANALYSIS OF A TYPICAL GARDEN SOIL (DRY BASIS)

		0 — 1 ft.	1 — 2 ft.	2 — 3 ft.
1.	Moisture % ...	3·24	2·77	2·02
2.	Loss on ignition ...	2·85	2·74	2·03
3.	Lime (CaO) % ...	0·14	0·32	0·73
4.	Phosphoric acid (P_2O_5) % ...	0·019	0·017	0·047
5.	Potash (K_2O) % ...	0·24	0·40	0 64
6.	Total Nitrogen (N) % ...	0·036	0·028	0·029
7.	Organic carbon % (Walkley and Black number) ...	0·15	0·10	0·05
8.	Available phosphoric acid (P_2O_5) % ...	0·0017	0·0026	0·0027
9.	Available potash (K_2O) % ...	0·0030	0·0056	0·0030
10.	Total Soluble salts % ...	0·053	0·083	0·022
11.	pH ...	8·54	8·20	8·35

BASE EXCHANGE PROPERTIES OF A TYPICAL GARDEN LAND SOIL.

	0 — 1 ft.	1 ft. — 2 ft.	2 ft. — 3 ft.
		(Milli-equivalents)	
Exchangeable Calcium ...	10·8	7·2	7·0
,, Magnesium ...	2·2	4·18	3·83
,, Sodium ...	2·08	3·59	2·91
,, Potassium ...	0·83	0·88	0·47
Cation Exchange capacity ...	16·0	15·8	14·0

From the tables it is seen that the garden-land soil contains a higher percentage of clay than the dryland soil. The soil and sub-soil can be classified as clay loams. The soil in all the three depths has a higher cation exchange capacity and more than 50% of the cations consist of calcium. As regards the chemical composition it cannot be said that the garden soil is richer in plant nutrients than the shallow dryland soil. But the garden soil is generally more fertile as it is able to retain moisture and manures better than the dryland soil. The garden-land soils are generally on the alkaline range.

Methods of Improving the Soils of the Lower Bhavani Project Area: Both the types of soils present in the Lower Bhavani Project area, namely the shallow red dryland soil (which constitutes the major soil of the tract) and the garden soil are poor. The shallow red soil is lateritic and highly porous with a low water-holding capacity. It is also poor in all the essential plant nutrients. As its capacity for retaining moisture is very low the dryland soil will lose the major portion of irrigation water let on to it by percolation and drainage. The garden soil which occurs only to a limited extent in the ayacut is deeper and it may, with suitable precautions, be adjusted for wet cultivation.

As both the types of soils are poor in all the essential plant nutrients it is necessary to build up their fertility. But the addition of adequate amounts of organic matter and commercial fertilizers necessary to improve the soils for good crop production, would involve enormous cost and would be beyond the means of most ryots. So a simple method is suggested by which, without much outlay, the soil can be improved. As is well known, leguminous green manure crops grown and ploughed in, increase the soil organic matter and nitrogen. When the legume is given phosphatic manures it makes very good growth and fixes nitrogen most efficiently. It is claimed that when other conditions are at optimum each pound of phosphate given to it enables the legume to fix about three pounds of nitrogen. So the simple process of growing a leguminous green manure crop with phosphatic fertilizer and ploughing it in increases the nitrogen and organic matter status of the soil. When the organic matter of the legume undergoes decomposition in the soil it mobilises soil potassium for the use of succeeding crops. The organic matter also improves the physical condition of the soil, binding together the soil particles into aggregates. The phosphate added to the legume is not lost: it is turned into available forms during the decomposition of the legume ploughed into the soil. So by growing a leguminous green manure crop on the soil with the application of phosphatic manures and then ploughing it in, the soil is improved in tilth and is enriched in all the essential plant nutrients, nitrogen, phosphoric acid and potash. The grain or cash crop which follows the legume will be benefitted considerably. In three to four years, by growing a suitable legume with phosphate before the cash or grain crop the fertility of the soil will be improved to produce good crops. The rotation of legume and crop should be continued every year since the loss of organic matter from tropical soils is considerable, especially in a soil with open texture. For the best performance of the legume it should also be

remembered that it should be inoculated with the specific bacterial cultures before sowing. It has been shown that daincha, dew-gram and *pillipesara* are very suitable legumes with phosphate for the Lower Bhavani Project Area. The phosphate should be applied to the legume at 30 lb. P_2O_5 per acre in the form of superphosphate.

Summary: There are two types of soil in the Lower Bhavani Project area. The main type is the shallow red soil 9″ – 2 ft. in depth, lateritic and porous. There are also patches of a deeper red soil three to four feet in depth. The water-holding capacity of both types is low. The soils of the area are of low fertility status, being deficient in all the essential plant nutrients. Their tilth and fertility status can be built up by growing a suitable leguminous green manure crop with application of phosphate and ploughing it in.

Acknowledgement: The traverse and soil sampling in the Project area were carried out by Sri T. Lakshmana Rao and M. R. Balakrishnan in 1933—'34. They also analysed the major portion of the samples for mechanical compesition by the rapid method and for water-holding capacity. Their report has not been published. The rest of the data given in the article are of recent dates (1953—'54). As water has been let out for irrigation from the Bhavanisagar Dam it is thought that it would benefit the ryots to have an idea of the nature of their soils and the means of improving them for good crop production.

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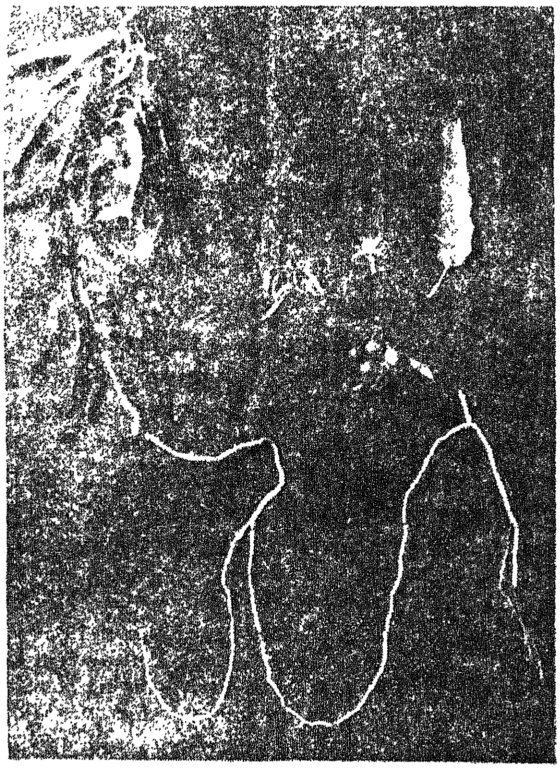
Research Notes

Solanum elaeagnifolium, Cav.
A new weed of cultivated lands in Madras

Introduction: Weeds are unwanted plants which are relatively useless, but cause great damage to crops and sometimes to livestock also, as some of them are very poisonous. Due to the interference of weeds in cultivated lands, crop production is often adversely affected, as weeds deprive the crops of moisture and mineral nutrients. Before finding out suitable methods of eradication of weeds from cultivated lands, it is necessary to understand their growth habits and methods of reproduction. Tadulingam and Narayana (1932) have described a good number of weeds found in South India, indicating control measures for each one of them. Under the family *Solanaceae,* they have mentioned few weeds of the genera *Solanum, Physalis, Datura* and *Withania.* In this article, the occurrence of an exotic species, *Solanum elaeagnifolium* Cav. as a weed of cultivated lands in Madras State, is recorded. This is a new introduction, which has not been recorded before.

Description of the weed: *Solanum elaeagnifolium* Cav. is native to tropical America, where it is commonly known as 'White horse-nettle' and 'Silver leaf nightshade'. It is a deep-rooted perennial belonging to the family *Solanaceae.* Muenscher (1935) in his description of this species, mentions that it is found as a weed in meadows, pastures and cultivated fields and is most troublesome from Missouri south-westward to Arizona.

The stems are two to three feet tall, branching and usually set with slender prickles. They are erect, arising from deep-seated rootstocks and creeping roots. Leaves are oblong to linear in shape, alternate, stalked and entire or wavy-margined. They are silvery white in colour due to a dense covering of starshaped clusters of hairs. Leaves are also armed with prickles. The flowers are violet and are shaped like a brinjal flower. being borne in cyme-like clusters; calyx with five narrow acute hairy lobes; corolla rotate, mauve in colour, five-lobed; stamens five with tapering anthers. Ovary white, hairy, developing into a globular, smooth, many-seeded yellow berry about half an inch diameter. Seeds are fairly small, nearly circular, flattened, finely granular and yellow to dark brown in colour. The ...ares of a plant. leaf, flower, inflorescence and a cluster of fruits ...und in plate (1).



Reproduction: This weed reproduces itself by seeds and creeping roots. Seeds are produced in abundance and their longevity under ordinary laboratory conditions in reported to be ten years. (Robbins *etal;* 1952). Creeping roots develop a number of adventitious buds which give rise to new shoots and thus the plant is able to spread very quickly. When the aerial portions of the plant are cut, regrowths were found to appear within twenty days from the root portion below. This method of vegetative reproduction makes the control of this weed by any mechanical means impossible.

Occurrence in Madras State: This exotic perennial weed was first observed in a garden-land plot of black clayey soil belonging to one Venkatasamy Naidu in the village of Siddanaikenpalayam of Palladam taluk in Coimbatore district. A few plants left unnoticed in the field a year ago, have multiplied very rapidly and covered nearly an acre of land by means of their creeping roots. Cultivation in this field is very difficult and the crops raised on it are very poor in growth and yields. On excavation of the soil underneath a few

plants, it was seen that the roots are slightly fleshy and thick, ranging from light brown to white in colour. The main roots extend to a depth of over five feet straight down into the soil. Lateral roots are observed to lie at a depth of about two feet from the surface. These extend to about one or two feet, then suddenly turn down and form new plants by the development of vegetative buds. Thus two plants seen close to each other will be connected by their roots. This weed has also been reported from Kangayam taluk where it is found in a two-acre piece of land.

The authors believe that this weed might have come in only through seeds found as admixtures with imported food grains such as wheat, maize etc. Since it is a deep-rooted perennial with creeping roots which serve as a means of rapid multiplication, its eradication is also difficult, as in the case of *Cynodon dactylon* Pers. (Hariali). Trials on the control of this weed with chemical herbicides are in progress and the results will be published elsewhere.

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T. R. NARAYANAN and
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Occurrence of Bisexual Flowers in Arecanut (*Area catechu* L.)

As a rule Arecanut (*Area catechu* L.) is a monoecious plant with both male and female flowers borne in the same inflorescence. The inflorescence is a spadix, where female flowers are borne generally on the basal half of the branches of spadix and the male flowers are borne on the distal half of these branches (which are modified into special filiform branches) in two rows. The floral structure has been described by Sands (1926) and Nambiar (1949). The male flowers in the spadix open first and then drop off. It takes about a month for all the male flowers to drop off from a particular spadix and then only the female flowers open and become ready to receive the pollen. Hence the fertilization is mostly by cross pollination, as the chances of the pollen fertilising the female flower of the same tree is very remote.

The authors recently came across an areca tree in a garden belonging to Sri S. Krishna Bhat at Adyanadka village in South Kanara District, where bisexual flowers occur in the same spadix, as well as unisexual male and female flowers. The female flowers are borne as usual on the basal half of the spadix and the male flowers and the bisexual flowers are borne on the distal half. The bisexual flowers vary in size and are considerably smaller than the regular female flowers and much longer than the male flowers (Size of bisexual flowers – length 0·5 to 0·9 cms; female flowers 1·0 to 1·5 cms. – male flowers 0·2 to 0·3 cms.) Perianth parts are the same as in female flowers. Stamens are 2–4 in number and mostly 3, with at least one fully developed anther, while the others are rudimentary at different stages of development. Pollen are profuse in the fully developed anthers and a few pollen grains are found even in the partially developed anthers. Stigma is trifid as usual and the ovary is smaller in size than the ovary in the unisexual female flowers. After fertilization, the fruit develops normally but the size of fruits (nuts) developed from such flowers in much smaller than the nuts developed from the female flowers. (Size of normal nuts 4·4 to 4·8 by 2·7 to 2·9 cms; bisexual nuts 2·7 to 3·0 by 1·9 to 2·0 cms.)

Generally when the male flowers drop off, that portion of the filiform branches where male flowers are borne, dries up and falls off or remains dried. But in this case, the nuts developed from bisexual flowers hang out distinctly from the main bunch (those developed from the female flowers) and give the appearance of a string of beads hung from the bunches, as the difference in size of these two kinds of nuts is very marked.

There is every possibility of these bisexual flowers being self-fertilized as both the sexes are found in the same flower. May be it is a freak or may be it is a hereditary character. All these aspects require further investigation. Bisexual flowers in areca was noticed in Assam by Raghavan and Murthy (1953). However, this is the first occurrence of such a phenomenon in areca trees in South India. There is only one tree showing such flowers in the above-mentioned garden and even that tree is affected by stem-breaking symptoms. Efforts are being made to keep the tree alive by providing artificial supports. The tree is said to be a profuse bearer with upto four bunches every year, with each bunch producing 500 to 750 nuts. The owner has been kind enough to spare seednuts from this tree and the seedlings from these will be raised for future study.

Acknowledgment: The authors are highly grateful to the Indian Central Arecanut Committee for having partly financed a scheme under whose auspices this work was carried out.

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N. R. ADYANTHAYA and
K. SHAMA BHAT.

Value of Lupins as Green Manure for Potato

The importance of organic manures, either as cattle dung, green leaf or compost for agricultural economy, is well-known. Though chemical fertilizers result in quick and increased crop returns, regular applications of organic manures are essential to maintain the permanent fertility of the soil.

So far as the potato farmer in the Nilgiris is concerned, farm-yard manure is always in deficit. This is because he does not keep animals for field work as the ryots in the plains do, since the steep slopes on which potatoes are raised are not easy for cattle traction. Hence the alternatives open to him are (1) the preparation of compost from green leaf and (2) the growing of a green manure crop *in situ* for incorporation into the soil.

Plenty of green leaf is available by cutting from the forests that abound in the hills. But then the question of labour, which is costly, comes in. Being a thinly populated region, there is not much labour even for routine field operations. Hence, the better way is to raise a crop of green manure. Blue bitter lupins have been found to be the best, as a result of trials and experience at the Agricultural Research Station, Nanjanad.

Raising a green manure crop of lupins between successive crops of potatoes resulted in consistent and significant potato yield increases, as recorded below, in the course of rotational trials at the Agricultural Research Station, Nanjanad.

Year of trial	Acre yield of potato in lb. (a) After fallow	(b) After lupins	Increased acre yield of potatoes in lb. due to green manuring
1942–'43	24,550	28,283	3,733
1944–'45	22,467	25,433	2,966
1946–'47	24,567	27,417	2,850

		First Year	Second Year
(a)	Two year rotation	.. Potato—Fallow	Potato—Fallow
(b)	,, ,,	.. Potato—Lupins	Potato—Lupins

All the three potato crops, the main, the second and the irrigated, can be supplied with lupins for green leaf.

The main potato crop is lifted in August. Seeds of lupins, at 60 lb. per acre, can be immediately sown and covered. The plants come up quickely with the help of the North-east monsoon rains and can be ploughed in after four months, when the crop is in flower. The main potato crop of next year will get the benefit of such application.

The fields intended for the second potato crop, which is planted in August, can be sown to lupins in March-April, as soon as a good soaking shower is received. Good growth takes place with the spring and early South-west monsoon rains and the crop can be forked in during July.

In regard to the irrigated potato crop, the lupins can be sown directly after lifting in May-June and the resulting crop ploughed under in November, to be available for the next irrigated potato crop, due for planting in January-February.

An yield of three to five tons of green manure is possible if the practice recommended is followed.

The stalks of lupins do not turn woody. The plants branch well and are profusely leafy. Other good points in favour of lupins are (1) the crop covers the ground against erosion of soil and water during heavy rains; (2) weed growth is considerably smothered; and (3) the crop is not damaged or eaten by cattle since the stalks are bitter.

Besides cropping in the fields, lupin seeds can be sown over the uncultivable wastelands and along the bunds for seed. Seeds obtained therefrom will be helpful to meet the requirements of the next season. When mature, the pods burst quickly and the seeds are scattered all round. Thus, without further sowings, it is possible to obtain seeds from such plants over a number of years.

The benefits of lupins as the ideal green manure for potatoes are now being realised by the potato farmers in an increasing way.

Agricultural Research Station, Nanjanad. K. SAPTHARISHI.

Reviews

Methods of collecting current Agricultural Statistics: *by R. D. Narain, Economic Division, Food and Agriculture Organisation of the United Nations, March 1955, Rome, Italy, 15 sh. (Orient Longmans Ltd., Mount Road, Madras).*

This sumptuous loose-leaf volume represents the results obtained from a programme undertaken by the Economics Division of the Food and Agriculture Organisation of the United Nations. The programme was commenced in 1947, when the Food and Agricultural Organisation took the lead in organising a world agricultural census and gave assistance to a number of countries in carrying out that programme. The next step was the establishment of training centres on Agricultural Statistics in different parts of the world under the expanded Technical Assistance Programme, manned by experts sent to various countries to assist the Governments in setting up statistical organisations and in applying the best statistical methods.

The present loose-leaf handbook incorporates the information assembled according to a standard pattern for the classification of methods that were found acceptable by most countries. This pattern enables broad comparisons to be made and enables a comparative understanding of the methods used in different countries and would go a long way in helping countries to view their own statistical systems in a broader perspective and thereby stimulate thought and action towards further improvement.

It is hardly to be expected in a work of this complexity and magnitude, that short-comings will not exist in the completeness of data shown for different countries, but one of the main purposes of this manual is to afford a starting-point for better and more accurate information. The manual is also somewhat incomplete in one or two other aspects, in its being limited to the basic items of current agricultural statistics, and not including such important items as agricultural prices, agricultural incomes, agricultural labour and wages. Secondly a few of the large countries have not been included, because the information that was made available from them was too meagre to be presented in the pattern evolved for description. But this, it is hoped, will be rectified in the near future.

The printing and get-up conform to the usual high standards of F. A. O. publications. [T. R. N.]

Report on 1950 World Census of Agriculture Vol. 1. *Census results by countries. Food and Agriculture's Organisation of the United Nations, Rome, Italy, 1955. 10 Shillings (Orient Longmans Ltd., Madras).*

This is the first volume of a series to be published in instalments. The entire report when completed is intended to deal with three different aspects of a world census of agriculture, (1) census results by countries (2) a methodological study of the various national censuses, and (3) analysis of the main subjects included in the census.

The importance of this work has been recognised since 1950 when a preliminary programme was prepared and submitted to Governments, reviewed by technicians and discussed at conferences of technicians from various countries of Europe, America and countries concerned with statistical programmes in less developed areas. Nearly 100 countries and territories have thus participated in the census. The results published in the present first volume of the series have been classified under the following headings :—

(a) Holding and Tenure.
(b) Land Utilisation.

(c) Agricultural population.
(d) Employment in Agriculture.
(e) Crops.
(f) Livestock and Poultry.
(g) Agricultural Technology.
(h) Fertilisers and soil dressings.
(i) Irrigation and drainage.
(j) Fragmentation (of holdings).
(k) Wood and Fishery Products.

The report is bound to be quite a useful one, coming as it does with the authority of the United Nation.

A perusal of the list of countries dealt with in this volume reveals however, that most of them are very small ones, except perhaps Alaska, West Germany and Northern Rhodesia. India and Pakistan are very significant omissions, though it is likely that the subsequent volumes might include these and other countries as well. The printing and get-up are very good. [T. R. N.]

Arid Zone Research. Plant Ecology — Reviews of Research. UNESCO. *Printed in France. 1955; pages 1–379. with 10 plates and four ecological maps of Australia and one of Iran, Israel and Turkey; with numerous text illustrations. Price 45 shillings. (Orient Longmans Ltd. India. Madras.)*

The present volume is a sequel to the report on hydrology issued in 1954. It comprises a review of work on the arid zones of the world excepting the Soviet and Chinese Republics. From a perusal of the report, it is seen that no continent is free from this ecological condition, viz. arid and semi-arid. In many countries, deserts and desert land conditions are seen to be gaining the upper hand, mainly man-made. The vegetation that once covered such areas have now disappeared. In the agriculture of such countries, it becomes a matter of prime importance to control the spread of the desert conditions, the drying-up of natural waterways and the swallowing up of fertile lands. A symposium of the sort presented in this book enables us not only to understand the causes which have contributed to the creation of such arid, semiarid and desert-land conditions, but also to find out means of combating the further spread and the reclamations of such lands so that they may be again brought under agriculture. It has been attributed in these reports that the degradation of the arid zone lands is in the main due to human factors such as over-grazing, denudation of forests for fuel etc. The review gives in the introduction, a summary of the work done so far in the different countries, contributed by several authors. It also brings out the fact that certain countries like the U. S. A., Canada and Australia have advanced far in the study of ecology of the plants and the related sciences, while there are other countries which lag woefully behind. An interchange of workers as suggested by some of the authors between such countries would certainly benefit this international problem. As suggested by the South American authors, an international organisation on the study of the arid and semi-arid zones, maintained independent of the governments of the States concerned, would go long way in solving this urgent problem. This review itself brings before the reader the various kinds of problems that are found in the different countries, what the extent of these arid zones are, what methods are being developed to combat these conditions, the vegetations that are now covering these areas and other metereological conditions prevalent. The UNESCO has done a great service in accomplishing the difficult work of getting together the work in various countries into a single volume. The book, brought out in English and French, is of great interest not only to botanists but to all biologists and workers in the field. N. K. S.

Gleanings

Cotton Cultivation in Rice Fallows in Coimbatore District: Investigations conducted during 1954 and 1955 at the Central Farm, Coimbatore on the cultivation of cotton as a well-irrigated summer crop, in the tank fed wetland block, after the harvest of paddy, gave very encouraging results. The varieties selected were P. 216 F, P. 23 F, Madras Cambodia Uganda 1 and Madras Cambodia Uganda 2 in 1954 and P. 216 F, P. 23 F and Madras Combodia Uganda 1 in 1955. Sowing was done on 9—2—1954 and 6—3—1955 in the respective years. The cotton crop came to harvest in the second week of June and completed by the middle of August, in both the years. The results are as under:—

Variety		Yield of seed cotton per acre in lb, 1954	1955
P. 216F	..	1,249	1,480
P. 23F	..	1,080	1,293
MCU. 1	..	672	749
MCU. 2	..	779	(Not tried)

In the spacing trials conducted with P. 216 F and P. 23 in both the years, a closer spacing of 1½ feet between the rows and 4½ inches between the holes in the row gave the maximum yield i. e. 1,411 lb. of kapas in 1954 and 2,023 lb. of kapas in 1955 in the case of P. 216 F cotton. The two Punjab varieties viz., P. 216 F and 23 F have a halo length of 24 to 25 mm. with a ginning per cent of 34 to 35 as against a halo length of 28 to 29 mm. and a ginning per cent of 34 to 35 in the control variety Madras Cambodia Uganda 1.

Record Cholam Yields: Among the irrigated types of cholam, strain Co. 12, (Mottai Vellai Cholam) is very popular. It has the shortest duration, viz., 85 days. The earheads are compact and oval in shape and the grains are chalky white in colour; the straw is pithy and sweet. The strain has been found suitable to the districts of Coimbatore and Tiruchirapalli. In the Udukkanpalayam village of Udumalpet Taluk, Sri P. Kandaswamy Gounder obtained an acre yield of 6,250 lb. of grain with this strain. This yield of 35 bags of grain (each 60 M. M.) per acre is a record for the State. The entire produce from a three-acre block was distributed under the village seed farm scheme at a function held on 21—8—1955 with the Head-quarters Deputy Director of Agriculture (Inspection) presiding. This achievement has spotlighted the strain and increased its popularity.

Ceylonese Varieties of Paddy for Wynaad: Wynaad is a high-lying tract of Malabar District, which is characterised by a heavy annual rainfall of over 90 inches and a high humidity range. Both these features are not quite ideal for the full development and maturity of the common South Indian paddy varieties as compared to their performance in the plains. Normally, incidence of serious pests and diseases, such as the case worm and jassids and Helminthosporium and paddy blast among the various types of diseases is a common feature in this tract. Sterility and improper development of grain which are attributed to the prevalence of high humidity and abrupt climatic changes also characterise the cultivation of paddy in this region. With a view to secure varieties suitable for the topography and climatic conditions of Wynaad, introductions were made from several countries including China, South Africa, Ceylon etc. Of these, two varieties viz., Maranellu and Chennellu, (introductions from Ceylon) have recorded outstanding results consistently over three successive seasons. Maranellu has given a mean yield

ranging over 2,000 lb. of grain per acre while Chennellu has given a still better record of 2,200 lb. of grain per acre. Both the varieties were unique in their freedom from major pests and diseases. The yields of these varieties were definitely more than the yield of the local varieties by 10 to 15 per cent and they returned a net profit of Rs. 160/- to Rs. 180/- per acre, which compares favourably with the profit realised from the local varieties. The varieties were suitable for the first crop season commencing from May June to December-January and their duration has varied from 195 days to 208 days under Wynaad conditions. These varieties deserve recommendation for extended cultivation in Wynaad.

Magnesium Fertilisation of Potatoes: A trial to study the influence of magnesium, applied both to the soil and to the crop as a spray, on the yield of potatoes was carried out on the main potato crop of 1955 at the Agricultural Research Station, Nanjanad. The soil applications were made at four levels, viz., A (1): Control (No magnesium), A (2): Magnesium sulphate at 30 lb. per acre at planting, A (3): Magnesium sulphate at 60 lb. per acre at planting and A (4): Magnesium sulphate at 90 lb. per acre in two doses (60 lb. at planting and 30 lb. after a month). Similarly, the spray applications were also made at four levels viz., B (1): Control (No magnesium), B (2): Magnesium sulphate at 10 lb. per acre, sprayed 45 days after planting, B (3): Magnesium sulphate at 10 lb. per acre, in two doses, spraying 45 and 60 days after planting and B (4): Magnesium sulphate at 20 lb. per acre, in two doses sprayed 45 and 60 days after planting. For the spray treatments, the chemical was dissolved in 100 gallons of water per acre, per spray.

The mean acre yields of tuber in lb. for the above eight treatments were as follows: A (1): 12,450, A (2): 14,500, A (3): 14,400, A (4): 14,400, B (1): 13,700, B (2): 13,350, B (3): 15,300 and B (4): 14,600. In general, applications of magnisium, either to the soil or as crop sprays, had resulted in increased yields, the maximum being recorded with the crop-spray application at 10 lb. magnesium sulphate twice (treatment B (3). The trial will be followed up in two more seasons for confirmation.

Mango — Air-layering: In order to observe whether mango, which is a member of *Anacardiaceae*, would also respond to air-layering treatment in the same way as the cashew, a few observational trials were conducted at the Cashewnut Research Station, Mangalore. Two varieties namely Bennet Alphouso and Kalapadi were worked as follows:—

		Date of operation	No. done
1. Bennet Alphonso	..	4—2—1955	25
2. Kalapadi	..	4—5—1955	10

A ring of bark, ½ inch wide was removed from shoots of a thickness slightly more than a pencil and moist moss was covered over the exposed wood and wrapped with 100 gauge Alkathene film (6″ x 5″) piece (per layer); the ends of the film were secured with twine. No watering was done subsequently. In Bennet Alphonso, six layers were successfully separated of which four had rooted in 40 days. The separation was, however done at the end of the two months in progressive stages. Of the ten shoots of Kalapadi, nine rooted, of which five were separated in 90 days and planted in the field immediately. The remaining four will be separated in the course of a fortnight. Rooting was as profuse in the two varieties of mango as is usually obtained in cashew. It may cost about four annas to produce a layer by this method, which is cheaper than the normal methods of grafting.

Cultivating A Coconut Garden: A coconut garden has to be regularly inter-cultivated to increase the yield and maintain it at a high level. Some points, however, have to be remembered.

Heavy soils should be cultivated when the moisture is just right for the purpose. Otherwise, the structure of the soil will be spoiled. A sandy soil, on the other hand, can be cultivated any time without any bad effects on the soil structure. Inter-cultivation on sloping lands must be done after the heavy rains are over. Otherwise the top soil will be eroded and lost. The operation should invariably be done across the contours. The object of interculturing a garden is to prevent the matting of roots on the surface. This will interfere with the free movement of water and air in the soil. Cultivation also helps in removing weeds. The depth to which the garden has to be cultivated and the frequency of the operation depend on the condition of the soil... [I C A R.]

Poultry Diseases—Early Protection Advised: Though most poultry-keepers know the usefulness of vaccinating their birds againse Ranikhet disease and fowl pox, it is common for them to wait till the birds are old.

It is better that vaccinations are done early. Vaccination against Ranikhet disease can be done when the birds are eight weeks old. Poultry-keepers are advised to get their birds vaccinated when they are between two and three months of age. When buying, it is safer to buy birds which are guaranteed to have been protected against Ranikhet disease and fowl pox... [I C A R.]

'Damping' Off in Seedlings — Cause and Method of Prevention: Young vegetable seedlings often rot at or below the surface of the ground, and fall over or wilt. This disease is called 'damping off'. Damping off is commonly seen in nurseries of tomato, brinjal, cauliflower, cabbage, etc, The disease can be prevented by providing proper drainage of the nurseries, sowing the nurseries thin and watering the plants carefully. Sprinkling coarse sand or charcoal powder over the surface of the soil has also been found to prevent the disease.

Deterioration in Orange Trees — Insufficient Soil Moisture and Nutrition Main Causes: Lack of soil moisture and insufficient nutrition have been found to be the major causes of the deterioration of mandarin orange trees reported from several orchards in Madras and Coorg. Trees in such orchards slowly deteriorate and die out in a few years. Investigation conducted by the Madras Government with financial assistance from the Indian Council of Agricultural Research in a large number of orchards in Malabar (Wyanad) showed that the local farmers' practice of digging round the trees twice a year was harmful to the trees. Covering the soil with dry leaves is being recommended as a substitute for this practice. Trees in these localities can be improved and fruit production increased, by applying such manures as farmyard manure (75 lb.) groundnut cake (10 lb.), superphosphate (1 lb,), potash)1½ lb.(and wood ash (20 lb.) per tree in two doses, in June and November... [I C A R.]

Notes and News

Under the auspices of Students' Club a debate was held in English, Tamil, Malayalam and Kannada on 14th October 1955. The subject for the debate was "The Formation of States must not be on linguistic basis". The judges were: Mr. A. H. S. Sarma, Mr. M. Sundaram, Mr. Madhava Menon and Mr. K. S. Shetty. The following students were selected as the best among the speakers: R. Krishnamurthy, U. S. Sriramulu (English), C. Gopal, Sundaresan (Tamil) Karunakaran (Malayalam) Rajaram Upadyaya (Kannada).

Another debate was conducted on 28-10-1955, with Sri Sankaranarayana Reddy, Dr. A. Mariakulandai and T. R. Narayanan judges. Mr. R. Govindarajulu and R. Krishnamurthy were selected as the two best speakers. The topic for discussion was "The recommendations of the States Reorganisation Commission, if implemented will run counter to the best interests of our country".

* * *

The second year students went on tour from 16th of September to 22nd of September. They visited the agricultural Research Stations at Pattambi, Taliparamba and Mangalore as well as other agriculturally important places. They studied the cultivation practices and the important crops of the West Coast.

* * *

Under the vegetable scheme of the Government of Madras, the students are now cultivating vegetables in Field No. 54 of Central Farm. Mr. C. A. Sivaraman is selected as the Secretary and he is now looking after the cultivation of vegetables. The main vegetables grown are Bhendai, Clusterbeans, Tomato, Brinjal and Gourds. The produce is used in the Students' Hostel.

* * *

Under the Social Service League of the Students' Club, milk distribution is being carried out for the poor children of the nearby village Poojaripalayam. A Night School for the children is also being run. During the recent Divisional Sports conducted by the Madras University our College won the third place by obtaining 35 points. Mr. Marappan and Ramachandran Nambiar were the top scorers.

* * *

Sri T. R. Subramanian, B. Sc., (Ag.), Assistant in Entomology, has been awarded the M. Sc. degree by the University of Madras, for his Thesis entitled "Studies on the Systematics and Biology of some weevil pests *(Curculionidae)* in South India".

Weather Review — For the month of October, 1955

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January	Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam)	8·1	— 3·9	38·9	South	Madurai	10·2	+ 2·8	30·2
	Tirurkuppam*	8·2	— 0·6	40 1		Pamban	4·3	— 4·2	19·3
	Vellore	2·7	— 4·1	30·3		Koilpatti*	2·9	— 3·2	15·5
	Gudiyatham*	7·3	+ 1·8	32·0		Palayamcottai	5·2	— 1·9	15·6
East Coast	Palur*	5·8	— 2·4	41·7		Ambasamudram*	0·6	— 5·9	19·4
	Tindivanam*	5·6	— 0·6	33·8	West Coast	Trivandrum	11·2	+ 0·5	70·2
	Cuddalore	3·8	— 7·7	38·8		Fort Cochin	20·2	+ 6·8	137·1
	Nagapattinam	9·1	— 1·5	34·9		Pattambi*	14·8	+ 2·6	95·1
	Aduturai*	8·6	+ 2·3	35·1		Kozhikode	22·9	+11·8	150·8
	Pattukottai*	8·6	+ 2·7	28·4		Taliparamba*	14·2	+ 6·1	136·7
Central	Salem	6·3	— 0·1	33·7		Wynaad*	10·8	+ 1·5	74·8
	Coimbatore (A. M. O.)*	1·9	— 3·3	14·9		Nileshwar*	11·4	+ 3·7	175·1
	Coimbatore	2·1	— 4·2	17·3		Pilicode*	13·0	+ 6·3	149·5
	Tiruchirapalli	9·3	+ 3·0	35·8		Mangalore	11·5	+ 4·2	148·5
						Kankanady*	11·8	+ 5·7	149·4
					Hills	Kodaikanal	12·3	+ 2·1	65·6
						Coonoor*	10·9	+ 2·9	40·3
						Ootacamund*	13·4	+ 4·9	62·4
						Nanjanad*	6·9	— 1·4	56·7

Note:— * Meteorological Stations of the Madras Agric. Dept.

The month began with a depression over Orissa. Rainfall was fairly widespread in Malabar, South Kanara and somewhat localised in Travancore-Cochin in the first three days of the month. A fresh westerly wave was found over the Andaman Sea on 4—10—1955. In the succeeding two days there was no large change in the weather conditions. On 7—10—1955 the change-over from the South-west monsoon conditions to the North-east monsoon conditions was felt throughout the country. Rains were fairly widespread in Malabar-South-Kanara and scattered in Tamilnad on 8—10—1955 and the next day also.

A cyclonic storm in the Bay of Bengal was noted on 10—10—1955, about 350 miles east of Visakapatnam. It became severe the same evening and crossed the coast close to Visakapatnam the next day morning and subsequently became weak. An easterly wave was found approaching the south Andaman sea on 12—10—1955. On 13—10—1955 the South-west monsoon withdrew from the region except in the extreme south of Travancore-Cochin. On 15—10—1955 the North-east monsoon established itself on the east coast. In the succeeding four days rainfall was fairly widespread in many parts of the Madras State. The monsoon became strong in the South-east Arabian sea on 20—10—1955. Two days later the monsoon got strengthened along the coastal Andhradesa by a shallow depression in the West Central Bay of Bengal. From 23—10—1955 to the end of the month thundershowers were widespread in Malabar-South-Kanara and fairly so in Travancore-Cochin and heavy but localised in various parts of Tamilnad.

Considering the month as a whole, the rainfall was below normal for practically the entire State, except the districts of Madurai, Tiruchirapalli, Malabar, South-Kanara, the Nilgiris and Kodaikanal hills. In fact, this sub-normal rain in October has depressed the enthusiasm of the cultivators, particularly in rain-fed tracts.

The noteworthy rainfalls and the zonal rainfall in inches are furnished below:—

Noteworthy Rainfalls			Zonal Rainfall			
Date	Place	Rain-fall in inches	Name of Zone	Rainfall for the month	Departure from normal	Remarks
9/10/55	Nagapattinam	4·0	North	6·6	— 1·7	Below normal
17/10/55	Madurai	4·0	East Coast	6·9	— 1·2	do.
do.	Trivandrum	4·0	Central	4·9	— 1·2	do.
18/10/55	Alleppey	4·0	South	4·6	— 2·5	do.
do.	Kodaikanal	3·0	West Coast	14·2	+ 4·9	Above normal
19/10/55	Ootacamund	3·0	Hills	10·9	+ 2·1	do.
22/10/55	Fort Cochin	4·0				
27/10/55	Tiruchirapalli	6·0				
29/10/55	Kozhikode	4·0				

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 11—11—1955.

C. B. M. & M. V. J.

Departmental Notifications

Gazetted Service—Postings and Transfers

Name and present post	Posted as
R. Balasubramaniam, Retd. Principal, Agricultural College, Coimbatore,	Principal, Agricultural College, Coimbatore.
Kunhiraman Menon, P., Agricultural Assistant Chemist,	Gazetted Assistant, Lecturer, in Chemistry, Coimatore.
Mohammed Sulaiman, S., (D. A. O., on other duty),	Regional Dy. Director of Agriculture.
Meenakshisundaram, K., Additional D. A. O., Madurai,	D. A. O., Guindy.
Ranganathachari, N., D. A. O., Kozhikode,	Additional D. A. O., Madurai.
Syed Mohammed, P, P., (D. A. O., on other duty),	Regl. Dy. Director of Agriculture.
Thangavelu, T. K., D. A. O., Guindy,	Regl. Dy. Director of Agriculture, Vellore.

Upper Subordinates

Name and present post	Posted on
Athmarama Iyer, P. S., A. to D. A. O., Cuddalore,	A. D., Theni.
Abdul Khader, M., P, P. A., (Myco), Tirunelvelly,	Instructor in Agricultural Grama Sevak Training Centre, Pattukottai.
Appadurai, R., Millet Assistant, Koilpattt,	Millet Assistant, Tirupathur.
Balasubramaniam, H., A. D., Vellore,	A. D., Thirukalukundram.
Balakrishnan, N. P., Paddy Assistant, Patambi,	Paddy Assistant, Taliparamba.
Dorai, S., Mysore,	Special A. D., Cotton, Sattur.
Gopinath, M., A. D., Quilandy,	Instructor in Agricultural Grama Sevak Training Centre, Taliparamba.
Jose, P. C., Extension Officer in Agriculture, Ooty,	Entomology Assistant, Kasargode.
Jayaraju, R., Instructor in Agricultural Grama Sevak Training Centre, Pattukottai,	P. P. A., Myco, Tirunelveli.
Kumaraswami, C., A. D., Kilayanur,	Oil Seed Development Assistant, Cuddalore.
Kunjamma, V. K., Librarian, Coimbatore,	Pulses Assistant, Coimbatore,
Kelukutty Menon, Paddy Assistant, Taliparamba,	Paddy Assistant, A. R. S., Pattambi.
Lingiah, N. K., Teaching Assistant, Economics, Coimbatore,	Extension Officer in Agriculture, Ooty.

Name and present post	Posted as
Malathy, M., Olavakode,	Botany Assistant, Coimbatore.
Mohammed Ghouse, A. D., Theni,	A. D., Mailam.
Madhava Menon, P., Assistant in Millets, Coimbatore,	Librarian, Agricultural College, Coimbatore.
Meenakshisundaram, D., Paddy Assistant, Patambi,	Paddy Assistant, Coimbatore.
Mammoo Koya, A. D., Gangaikondan,	Paddy Assistant, Pattambi.
Nagarathnam, A. K., Pulses Assistant, Coimbatore,	Millets Assistant, Ariyalur.
Narayanakutty Nair, T., Horticulture Assistant, Coimbatore,	Supervisor for Sample Survey, on Pepper.
Nagarajan, S. S., Assistant in Paddy, Coimbatore,	Assistant in Plant Physiolagy, (Ground-nut) Coimbatore.
Padmanabha Nambiar, K. P., Fruit Assistant, Taliparamba,	Supervisor for Sample Survey, on Pepper.
Ramachandran, P. K., F. M., Bhavanisagar,	Oil Seed Assistant, Bhavanisagar.
Raghavan, K., Special A, D., Sriperambudur,	Extension Officer for Agriculture, Sriperambudur Block,
Radhakrishna Reddy, A., A. D., Villivakkam,	A. D., Guindy.
Shanmugam, C. T., Oil Seed Assistant, Bhavanisagar,	F. M., Bhavanisagar.
Sethuraman, M. S., P. A., to D. A. O.. Salem,	P. P. A., Entomology, Salem.
Sethupathi, S., P. P. A., Salem,	A. D., Avoor.
Srinivasan, K. V., Special A. D., Tirukalukundram,	A. D., Jayankondan.
Subramaniam, T. R., Pollachi,	Assistant, in Entomology, Coimbatore.
Vaidyanathan, R., A. D., Madurai,	A. D., Ayyampalayam.
Veeraswami, R., Millet Assistant, Tirupathur,	Millet Assistant, Koilpatti.

THE ASSOCIATION OF THE UPPER SUBORDINATE OFFICERS
OF THE
MADRAS AGRICULTURAL DEPARTMENT
LAWLEY ROAD, P. O., COIMBATORE

The 26th Annual General Body Meeting of the Association was held at the Agricultural College on 20—10—1955. Sri P. N. Muthuswamy presided over the meeting. Sri S. Muthuswami, Secretary, presented the Annual Report for the year 1954—1955 and appealed to the Upper Subordinate Officers to enrol themselves as members and strengthen the Association. The following resolutions were passed for submitting to the Government.

1. To revise the scale of pay of upper subordinates to Rs. 125—5—150—10—350.

2. To increase the posts of District Agricultural Officers so as to have a ratio of not more than 1:10 between gazetted and non-gazetted officers in the general section.

3. To give due weight for seniority in promotions of Upper Subordinates to the District Agricultural Officers' cadre.

4. To fix the ratio between gazetted and non-gazetted posts in the Department so as to give fair chances for all subordinates to get promotions without undue stagnation or alternatively to institute a run-on grade of Rs. 150—5—200—10—300—15—450 in the place of gazetted and non-gazetted distinctions.

5. To increase the Fixed Travelling Allowance for Agricultural Demonstrators to Rs. 75/- per mensem.

6. To enchance the Daily Allowance to non-gazetted officers by at least 50% over the existing rates.

7. To show special preference to Agricultural Upper Subordinates for the posts to be created to enforce the Agricultural Income-tax Bill, Crop Insurance Bill and Minimum Wages Bill.

8. To show special preference to Agricultural Officers for the higher posts in the Community Projects and National Extension Service schemes.

9. To permit such of the Upper Subordinates who have put in 20 or more years of total service and who wish to retire from service, to retire on full pension or at least on proportionate pension without getting themselves invalidated.

10. To abolish the system of maintaining confidential dossiers.

11. To reinstitute the Indian Agricultural Service as in the case of All-India Services for other Departments.

12. To recognise the Heads of Research sections as guides for Research students.

13. To promote Upper Subordinates in the Research sections to Assistant Research Officers' posts by consulting records of service and work done and not by personal interview at every time, as it involves monetary difficulties.

14. To enable the teaching staff members of the Agricultural College to avail of penultimate Saturdays as hitherto.

The following were elected as Office bearers for the next year.

President:	Sri P. N. Muthuswamy.
Secretary:	,, K. Kuppamuthu.
Treasurer:	,, M. V. Jayaraman.
Members of the Managing Committee:	,, S. Muthuswami and
	,, Varisai Mohamed.
Auditors:	,, K. R. Nagaraja Rao and
	,, V. Mahadeva Iyer.

The Meeting terminated with a Vote of Thanks proposed by the Secretary.

A deputation of the Association met the Director of Agriculture, Madras on 3—11—1955 and submitted its points on the various resolutions passed and sent up.

A large number of Upper Subordinates especially in the Districts have not yet enrolled themselves as members in this Association which works for our welfare. I once again appeal to them all to become members of the Association and strengthen our cause.

Subscription for Life membership Rs. 5/- which can be paid in instalments. Entrance fee As. 8.

Union is Strength! **United we Prosper!!**

S. Muthuswami,
Honorary Secretary.

DISTRICTS
S. ARCOT; COIMBATORE
MALABAR; S KANARA
RAMANATHAPURAM
TIRUNELVELI
NORTH ARCOT

CROPS
COTTON ; GINGELLY
GROUNDNUT
COCONUT
ARECANUT
TOBACCO

SERVICE FOR REGULATED MARKETING

Sannhemp Fibre from Shiupur

by

T. K. VISVANATHAN, B. Sc. (Ag.),
Inspector, Sannhemp Grading, Shiupur (Banaras)

Sannhemp *(Crotalaria juncea)* fibre has been an export item for many years and earns foreign exchange to the tune of one to two crores of rupees annually. In this paper a brief account is given of its handling and trade at Shiupur for foreign and local markets.

Sannhemp is grown on a large scale in Uttar Pradesh as a '*Kharif*' crop. Soon after the commencement of the monsoon in the latter half of June, seeds are broadcast and a ploughing is given. The crop is harvested after about three months, just before the flowering stage. The harvested green stems are retted in ponds for three to four days and the bark, which forms the fibre is then extracted, cleaned and dried.

Assembling: Shiupur, near Banaras in Uttar Pradesh is the leading assembling centre for sannhemp fibre, accounting for nearly 65,000 bales out of over a lakh of bales pressed in the whole of India in a year. At Shiupur, the bulk of this consists of "Benares" type of hemp and 3,000 to 5,000 bales are of 'green' also known as 'Ganjam' type. Balers purchase sannhemp brought to Shiupur by small dealers. Some of the up-country merchants also send sannhemp to Shiupur for sale to balers through brokers. Big balers send their buying agents to outside markets also, for purchasing hemp. The hemp is mostly brought on camels from villages not connected by good roads, and on bullock carts, from within a radius of 10 to 15 miles. From centres upto about 50 miles lorry transport is also

used. From longer distances, the crop arrives by rail. The following are the main supplying areas:—

S. No.	Description	State	District		Approximate quantity of loose hemp calculated in terms of finished bales
1.	Benares Hemp	Uttar Pradesh	Banaras		22,000
		,, ,,	Pratabgarh		15,000
		,, ,,	Azamgarh		7,000
		,, ,,	Allahabad		6,000
		,, ,,	Fatehpur		6,000
		Bihar	Saran etc.		2,000
		Others			1,000
				Tatal	60,000
2.	Green Hemp	Uttar Pradesh	Shajahanpur Philibit Moradabad Etawah etc.		2,500
		Madhya Pradesh	Jubbulpore Betul Chindwara Mandla etc.		2,500
				Total	5,000

There are four hydraulic presses (similar to those used for pressing cotton) at Shiupur, with a combined pressing capacity of about 650 bales in an eight-hour day. Presses work to capacity generally from the middle of October to middle of April. Sometimes the peak period extends up to the end of May. During the other months the rush of work at the presses is very much less.

Grading: At each one of these presses there are a number of packers who are authorised to 'Agmark' sannhemp. The work of cleaning the fibre free from adherent materials like broken stems, leaves etc. of sannhemp plants to bring down the refraction within the specified limits, and of grading the same in accordance with Agmark specifications, is entrusted by the packers to contractors, who are paid on piece-work basis.

'Benares' hemp is greyish or light-brown to white in colour and comes in a tangled form. The loose hemp bundles and *kacha* bales are opened and cleaned with the help of spiked boards known locally as '*Kantas*'. These consist of wooden boards 2 feet by 1 foot on which are fixed 30 to 40 spikes 12 inches high, made of half-inch-diameter mild steel rounds. In this process most of the refraction is

removed. The cleaned fibre is then sorted into three Agmark grades, on the basis of colour shades and amount of refraction still left in the fibre, namely Benares 1, Benares 2 and Benares 3. The loose graded fibre is then made into '*Morahs*' of 9 to 10 lb. each by giving a slight twist. Nine such morahs are fastened with a '*Chhote*'* of the same grade of fibre to make a '*Bohja*'. About 4 to 5 such '*Bohjas*' go to form a bale of 400 lb.

From certain areas, the white fibre arrives in the form of long line fibres instead of in a tangled form as a result of greater care taken at the time of extraction of fibre. This is prepared into '*Chapra*' grades by further straightening and cleaning the fibres.

The green or Ganjam hemp consists of straight line fibres. There are five qualities under green sannhemp, viz. (1) C. P. (2) U. P. (3) Kantabanji Raigarh (4) Dohad and (5) Philibit. Variations in characters, lustre, softness and strength distinguish them from one another. The qualities have come to be associated with certain areas, irrespective of their centres of production.

Each of the first-named four qualities is graded into five grades viz. (1) Itarsi Fine (2) Seoni Fine (3) Jubbulpore Fine (4) Jubbulpore No. 1 and (5) Shorts. The factors taken into consideration for determining the grades are (a) colour, (b) length (c) refraction. Philibit quality is harsher and dirtier than others and is graded into Philibit Extra fine, Philibit Fine and Philibit No. 1. Some times green hemp is dressed or scutched i. e. combed by passing through '*Kantas*' which are different from those used for hackling Benares Hemp. The spikes are spaced more closely, there being about 100 spikes to the same area. They are also thinner and are made of hard steel to make them last longer. The dressed green hemp is graded into 1. Red Dressed, 2. Green Dressed, 3. Black Dressed and 4. Cross Black Dressed. When the green hemp is dressed the weaker and shorter fibres get separated as tangled mass. This is again sorted mainly according to colour and refraction into 1. Red Tow 2. Green Tow 3. Black Tow grades under each quality viz. C. P., U. P. and so on.

The usual rates per finished bale paid by balers to contractors for cleaning and grading are Rs. 3/- for Banares and undressed Green Hemp grades, Rs. 7—5—0 for Chapra Grades, Rs. 3—8—0 for Tows, and Rs. 3—8—0 for Dressed grades.

*'*Chhote*' is made by twisting strands of loose hemp.

Packing: The balers keep the graded loose hemp '*Bohjas*' in their premises in lots of 50 bales or less. Prior inspection of material is made by Government Inspectors. Representative samples are drawn from each lot and examined for quality and refraction content and if found to conform to Agmark standards, the lot is allowed to be pressed. A close supervision is also kept at the time of pressing. Agmark labels serially numbered are securely affixed to each bale at the time of pressing, which would enable one from any corner of the world to trace the packer.

A certain percentage of finished bales is opened by the Chief Inspector, Sannhemp Grading, for checking of the grade. If the first bale so opened is found to be below the mark, the baler is given the option to offer two more bales to be opened from the same lot for further check-sampling. If the average quality and refraction of the material of these three bales are below the prescribed standards, the lot is rejected. The baler then has to cut open all the bales and regrade the fibre or, as an alternative, can get all the bales of the failed lot endorsed to the appropriate lower grade. Thus, on account of the inspection service provided by the Government of India for quality control, the consumer is assured of standardised quality. Disputes and arbitrations have become negligible.

The current pressing charge is Rs. 5/- per finished bale, and this includes charges for carrying loose hemp from packers' godown to the press premises, pressing the hemp, stacking the bales and loading them into railway wagons. Three of the presses are provided with railway sidings. This facilitates easy unloading of incoming loose hemp and loading finished bales.

The number of bales Agmarked at Shiupur under various grades during the past three years are given below:

Sl. No.	Particulars	Grade		1952—'53 Nov.-Oct.	%	1953—'54 Nov.-Oct.	%	1954—'55 Nov.-Jun. (8 months)	%
I	Benares Hemp	B—1	..	13,248	24	17,236	30	31,807	47
		B—2	..	27,426	51	22,835	52	28,553	43
		B—3	..	13,318	25	10,693	18	6,887	10
		Total	..	53,992	100	57,764	100	67,247	100
II	Chapra Grades	Ch. 2	..	56		..		25	
		Ch. 3	..	471		1,406		5,269	
		Total	..	527		1,406		5,294	

		Benares I			Benares II			Benares III		
1954										
January	...	152	14	0	114	0	0	63	14	0
February	...	150	6	0	110	0	0	62	2	0
March	...	148	10	0	106	12	0	66	10	0
April	...	157	8	0	112	6	0	69	12	0
May	...	176	8	0	127	8	0	77	10	0
June	...	177	2	0	131	0	0	79	12	0
July	...	169	12	0	130	6	0	75	6	0
August	...	172	0	0	137	4	0	77	12	0
September	...	158	12	0	122	12	0	77	2	0
October	...	139	4	0	121	4	0	77	4	0
November	...	143	0	0	125	0	0	83	4	0
December	...	168	12	0	148	14	0	107	2	0
1955										
January	...	182	4	0	174	4	0	126	0	0
February	...	183	6	0	176	4	0	128	0	0
March	...	177	12	0	168	8	0	122	4	0
April	...	174	8	0	164	8	0	119	8	0
May	...	171	8	0	150	12	0	107	8	0
June	...	162	8	0	142	0	0	97	8	0

Review of Market Conditions of Commercial Crops in the areas of Market Committees, for September, 1955

I. **Cotton Stocks:** 1. *Tiruppur:* The cotton market at Tiruppur started with an opening stock 7,601 cdys. of Cambodia and 2,953 cdys of Karunganni lint in the month. Arrivals during the month accounted for 4,189 cdys. of Cambodia and 1,176 cdys. of Karunganni lint as against 6,292 cdys. of Cambodia and 2,086 cdys. of Karunganni during August 1955. These include 988 cdys. of Cambodia and 78 Cdys. of Karunganni lint ginned locally. Despatches from Tiruppur were 3,512 cdys. of Cambodia and 216 Cdys. of Karunganni lint which were mostly to Orissa, Bombay, Travancore-Cochin State and to other districts within the State. The closing stock at the end of the month amounted to 8,278 cdys. of Cambodia and 3,913 of Karunganni lint.

The kapas market at Tiruppur opened with a stock of 12,881 pothis of Cambodia and 2,614 pothis of Karunganni as the carry-over stock of previous month. Arrivals during the month accounted for 10,408 pothis of Cambodia and 2,472 pothis of Karunganni kapas as against 13,158 pothis of Cambodia and 3,747 pothis of Karunganni during last month. Disposals amounted to 15,827 pothis of Cambodia and 3,096 pothis of Karunganni kapas. The market closed at the end of the month with a stock of 8,002 pothis of Cambodia and 1,990 pothis of Karunganni kapas.

Notwithstanding the general brisk transactions in the Tiruppur market, there was no tendency for the prices to rise.

2. *Koilpatti:* In Koilpatti market there was an opening stock of about 500 pothis of Karunganni kapas at the beginning of the month. Fresh arrivals from neighbouring villages amounted to 1,000 pothis as in the previous month. The total quantity ginned during the month amounted to 1,500 pothis. There was no stock as kapas at the end of the month.

Though the season for Karunganni has come to a close it is estimated that about 3,000 candies are still left with the producers unsold. About 4,000 pothis of Uganda kapas were received during the month from Sankarankoil Market. Uganda arrivals have declined since the season has advanced. The demand from local Mills in the State continued to be slack.

3. *Ramanathapuram District:* The three markets of Virudhunagar, Sathur and Rajapalayam put together opened with a stock of 1,000 cdys. of Karunganni lint alone. Arrivals during this month were 6,910 cdys. of various varieties (1,960 cdys. of Karunganni, 4,700 cdys. of Uganda and 250 cdys. of Cambodia) as against 6,120 cdys. of lint of various cotton during previous month. Disposals took away 7,060 cdys. which included 2,960 cdys. of Karunganni 250 cdys. of Cambodia and 3,850 cdys. of Uganda lint. There remained 1,653 cdys. of lint at the close of the month which included 800 cdys. of Karunganni and 850 cdys. of Uganda lint.

The market on kapas in the above three centres opened with a carryover stock of 7,600 pothis (1,100 pothis of Karunganni and 6,500 pothis of Uganda). Arrivals during the month amounted to 29,850 pothis (which included 5,750 pothis of Karunganni, 22,300 pothis of Uganda and 1,800 pothis of Cambodia) as against 35,550 pothis during August 1955. 30,450 pothis comprising of 6,550 pothis

of Karunganni 22,300 pothis of Uganda and 1,600 pothis of Cambodia were disposed of during the month leaving a closing stock of 7,000 pothis consisting of 300 pothis of Karunganni, 6,500 pothis of Uganda and 200 pothis of Cambodia.

4. *South Arcot District:* During the month the markets of South Arcot district opened with a stock of 105 pothis of cotton kapas while the receipts amounted to 870 pothis. 805 pothis in all were despatched to Tiruppur in Coimbatore district leaving a month-end stock of 34 pothis.

2. **Prices:** 1. *Cotton lint:* The prices of cotton lint showed a downward trend at Tiruppur market. During the month the prices of Cambodia lint which was prevailing at Rs. 940/- at the beginning gradually declined by about Rs. 30/- in the middle and regained the original level at the end of the month. The prices in general were less by Rs. 20/- per cdy. when compared to shown the previous month. Prices in respect of Karunganni had not any perceptible fluctuations.

Prices of Karunganni continued to be steady in spite of poor demand for it. Transactions centred round to inferior types at prices varying from Rs. 525/- to 560/- per cdy. The top prices as between different qualities ranged between Rs. 550/- and Rs. 700/- while the lowest prices ruled between Rs. 550/- and Rs. 650/-. Prices of Uganda lint opened at Rs. 1,140/- per cdy. and closed at Rs. 1,120/- at the end of the month. Uncertified lint fluctuated narrowly around Rs. 1,000/- per cdy.

The Karunganni cotton lint market in the three places of Virudunagar, Sathur and Rajapalayam opened at the rates of Rs. 650/- to Rs. 686/- for the 1st crop, Rs. 580/- to Rs. 630/- for 2nd crop, Rs. 530/- to Rs. 575/- for Tinny and Karunganni mixture at Rs. 480/- to Rs. 525/- per cdy. for Kamuthi tinny. These markets maintained a steady level till the end of the third week, but in the last week the prices had shown a slight recession and stood at Rs. 653/- to Rs. 684/- for 1st crop Rs. 580/- to Rs. 630/- for 2nd crop. Rs. 520/- to Rs. 560/- for Tinny Karunganni mixture and Rs. 456/- to Rs. 515/- for Kamuthi tinny. The prices of Madras Uganda cotton lint in these markets opened at the rates as below:

Rs. 1,266/- M. U. 2 seed farm per candy.
Rs. 1,236/- to 1256 M. U. 2 certified ,,
Rs. 1,141/- to 1156 M. U. 1 certified ,,
Rs. 1,020/- to 1026 M. U. 1 uncertified ,,

The market was not active during the month for Uganda cotton and the prices were more or less steady. The approximate quotations are as follows:

M. U. 2 Certified	Rs. 1,205/- to 1,220/-
M. U. 1 ,,	Rs. 1,100/- to 1,120/-
Uncertified	Rs. 980/- to 1,000/-

The Cambodia lint in these markets opened at Rs. 725/- to 750 per candy and later on showed a slight recession towards the closing of the month.

2. *Kapas:* The price of Cambodia kapas in Tiruppur Market fluctuated within narrow limits of Rs. 109 to 113 per pothy. The prices of Karunganni kapas both for Cambodia and Karunganni prevailed during the corresponding month of last year were of the order of Rs. 121 and 100 per pothy.

The price of Karunganni kapas opened at Rs. 74 for the best quality and continued to be steady in the same level. The price of second quality kapas ranged between Rs. 68 to 70 per pothi. Price of Uganda kapas ruled uniformly steady at Rs. 120 per pothi.

The Karunganni kapas market in the three markets of Ramanathapuram district opened at the rates of Rs. 83/- to Rs. 85/- per pothi for 1st crop, Rs. 48/- to Rs. 75/- for 2nd crop and Rs. 35/- to Rs. 44/- for Tinny. There was a general increase in the prices of inferior quality kapas as a result of sustained demand. The prices at the end of the month were as follows:—

Rs. 78—12—0 to 85—8—0 for I crop per pothi.
Rs. 61—12—0 to 74—8—0 for II crop per pothi.
Rs. 44/- to Rs. 52/- Tinny per pothi.

The Uganda kapas market opened at the rates of Rs. 132 to Rs. 136/- for M. U. 2, Rs. 122/- to Rs. 131/- for Uganda 1st quality Rs. 105/- to Rs. 118/- for 2nd quality, and Rs. 140/- to Rs. 156/- for M. U. 2 seedfarm kapas. The prices ruled stead during the month and the prices at the end are as follows:—

Rs. 140/- to Rs. 148/- for M. U. 2 Seed farm.
Rs. 131/- to Rs. 136/- for M. U. 2 certified.
Rs. 122/- to Rs. 127/- for I quality Uganda.
Rs. 105/- to Rs. 118/- for II quality Uganda.

Sl. No.	Particulars	Grade		1952—'53 Nov.-Oct.	%	1933—'54 Nov.-Oct.	%	1954—'55 Nov.-Jun. (8 months)	%
III	Green undressed grades	Itarsi Fine	..	..	..	26	..	54	
		Seoni Fine	..	..	..	593	..	958	
		Jub. Fine	..	..	..	2,154	..	1,925	
		Jub. No. 1	..	..	..	1,045	..	1,064	
		Shorts	..	..	..	593	..	810	
		Philibit	..	..	...	35	..	..	
		Total	..	..	..	4,446	..	4,811	
IV	Green dressed grades	Red Dressed	..	13	..	44	..	204	
		Green „	..	192	..	326	..	511	
		Black „	..	222	..	825	..	299	
		Gross Black Dressed	..	8	..	34	..		
		Total	..	435	..	1,229	..	1,014	
V	Green Hemp Tows	Red Tow	..	28	..	26	..	145	
		Green Tow	..	178	..	266	..	320	
		Black Tow	..	156	..	314	..	162	
		Total	..	362	..	606	..	627	
		Grand Total	..	55,316		65,451		78,993	

The trend of packings under various grades more or less indicates the average quality of the crop for that season. The 1952—'53 crop was poor yielding only 24% of B (Banaras)-1 grade, while the output of B-3 grade came to a high figure of 25%. The 1953—'54 crop was somewhat better, giving a lesser outturn of B-3 and slightly higher percentage of B-1 grade. The crop of 1954—'55 was one of the best seen for some years due to favourable seasonal conditions. The packings during the first eight months for which figures are available at the moment gave 47% under B-1, 43% under B-2 and only 10% under B-3. The increase in *chapra* grades during this year is also significant.

The Agmark grading has created confidence in the buyers and has considerably enhanced the reputation of Indian Sannhemp in foreign markets.

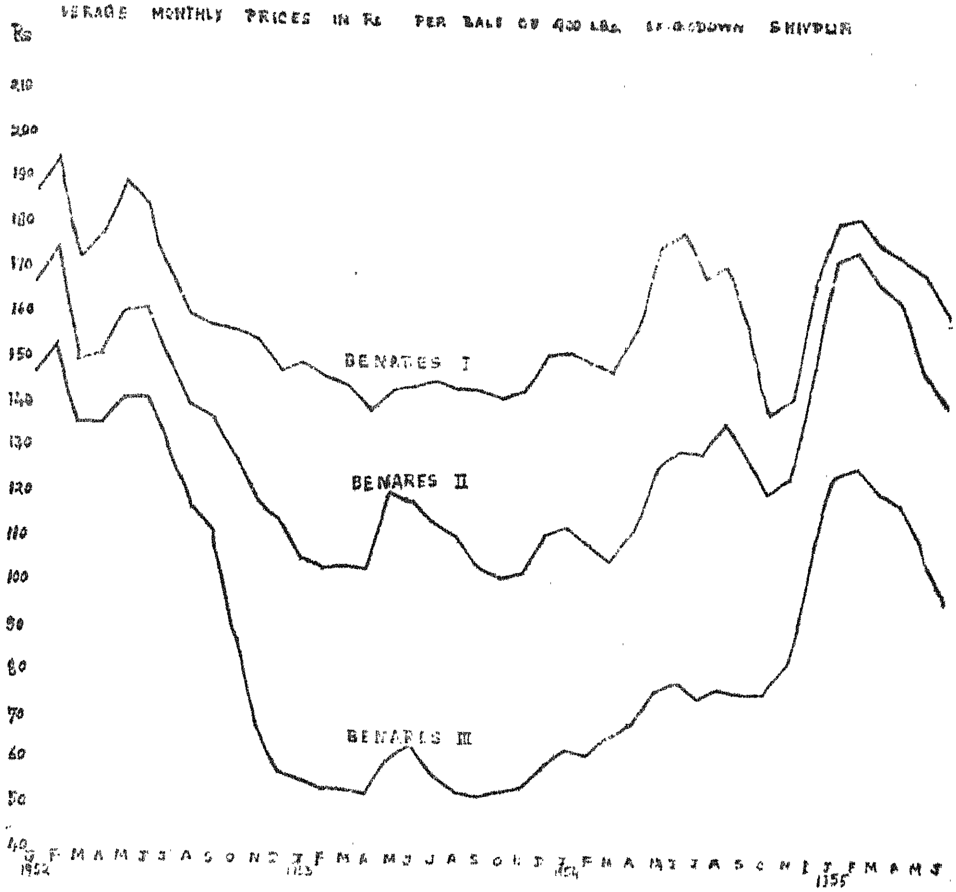
Shiupur Sannhemp Market: Most of the balers sell their bales at Shiupur itself to shippers while a few export them directly. The bulk of the sales is on forward contract system though spot sales are also common. Prices are quoted in rupees on Agmark grade basis per bale of 400 lb. f. o, r. Kidderpore Docks–the point of the embarkation at Calcutta. Sales take place through the local brokers on stipulated contract forms, and sellers receive payment on production of railway receipts. The balers also get credit facilities from banks upto 70% of the value on hemp kept in godowns at Shiupur for loose as well as pressed hemp.

Prices: The monthly average prices of sannhemp at Shiupur during the past three years are given in the appendix. The accompanying chart represents the price trends during this period. Prices at Shiupur depend on a number of factors, interacting on one another such as foreign demand, quantity and quality of our own crop in relation to competing crops of foreign growths like True Hemp (*Cannabis sativa*) flax (*Linum usitatissimum*) etc. High prices prevailed in Shiupur during 1952 due to the Korean war and B-1 grade touched Rs. 194—8—0 per bale in February 1952. With the easing of world tension in 1953 prices of all commodities including sannhemp declined. An improvement in foreign demand in 1954 was reflected in the recovery of prices from January 1954. B-1 grade fetched Rs. 179—2—0 in Junn 1954. The 1954—'54 season crop was good qualitatively and quantitatively. With the arrival of this crop into the market the prices showed initially a sagging tendency. A partial failure of the Italian crop, however, stimulated a higher demand for Indian hemp and prices began to look up once again. The quotations for B-1 grade rose from Rs. 139—4—0 in October, 1955 to Rs. 183—6—0 in February, 1955. The price differential between B-1 and B-2 grade narrowed to less than Rs. 7/- due to higher output of B-1 grade as against a price difference of Rs. 18/- witnessed in October, 1954. The overseas demand slackened again in February, 1955 and stagnant conditions prevailed during next half year and prices began to show a gradual fall.

The Indian sannhemp is preferred in foreign countries owing to its relatively low cost. According to Wigglesworth & Co., London, the following were the prices in London during the year 1953 and 1954:—

Prices in £ per Ton C. I. F. Ports

Month	*Indian True Hemp* Grade S. B.		*Yugoslavian Hemp* Swing hemp-1		*Indian Jute* Crack Daisea 2/3		*Indian Sannhemp* *Jubbulpore Fine*		*Benares-2*	
	1953	1954	1953	1954	1953	1954	1953	1954	1953	1954
January	275	203/10	..	..	81	101	..	72	..	62
February	264	203/10	..	..	81	..	..	72–74	..	60
March	264	203/10	..	..	81	96	56	70–72	62	59
April	264	203/10	..	174/5	84/5	103	58–61	72–76	62	64
May	264	203/10	..	174/5	93	103	67	78–82	67	70
ne	264	203	..	173/10	91	96	64	76–80	64	69
	..	203	..	173/10	..	93	65	74–78	64	70
st	264	203	..	..	90/4	102	65	75–78	60	74
ber	203/10	230	..	..	84	105	63	75–78	58	74
	203/10	241/5	..	173/10	96–98	105–110	63	70–74	57	65–66
	203/10	..	..	..	100	..	67	..	59	..
	203/10	241/5	..	186	..	115	67	80–85	60	78–80



Exports: Nearly 90% of Benares hemp and almost all the green hemp baled at Shiupur are exported to U.K., U.S.A., Belgium, Germany, Greece, Holland etc., with U. K. absorbing the bulk of the exports. Shippers usually consign their parcels to principal brokers at London. The latter book orders from the manufacturers and call for quotations from the Indian Shippers. Negotiations are carried on by cablegrams and a deal is completed in 24 to 48 hrs. The same brokers also effect sales on the European continental markets. The exports are on the increase. The demand from Indian Paper Mills has hitherto been moderate but it is improving.

Utilisation of Sannhemp: The Benares hemp is used mainly in the manufacture of paper. It is also made into a paste by mixing with tar and other ingrediants and used as 'Oakum' for filling seams of ships. The *Chapra* and green hemp undressed grades are

made into twine, ropes and fishing nets. Dressed green hemp is used for the manufacture of canvas, fire hose and other similar products. Locally mattings, twines, ropes and fishing nets are prepared out of sannhemp.

APPENDIX

Average monthy prices of Sannhemp in rupees per bale of 400 lb. ex-godown Shiupur.

		Benares I			Benares II			Benares III		
1952										
January	...	187	0	0	167	0	0	147	0	0
February	...	194	8	0	174	8	0	153	8	0
March	...	172	8	0	150	0	0	153	4	0
April	...	177	8	0	150	12	0	135	12	0
May	...	189	8	0	160	4	0	141	0	0
June	...	184	12	0	161	8	0	141	4	0
July	...	170	4	0	150	4	0	130	4	0
August	...	159	8	0	139	8	0	116	8	0
September	...	157	8	0	137	8	0	110	8	0
October	...	156	12	0	128	8	0	89	8	0
November	...	154	12	0	118	12	0	68	8	0
December	...	147	12	0	114	12	0	58	0	0
1953										
January	...	149	4	0	116	0	0	56	12	0
February	...	146	12	0	114	0	0	54	12	0
March	...	144	10	0	114	10	0	54	10	0
April	...	139	0	0	113	8	0	53	8	0
May	...	143	12	0	121	0	0	61	4	0
June	...	144	4	0	119	8	0	64	12	0
July	...	145	12	0	114	4	0	57	12	0
August	...	144	12	0	111	0	0	54	0	0
September	...	144	0	0	104	12	0	53	0	0
October	...	142	12	0	102	12	0	54	0	0
November	...	143	4	0	103	8	0	54	12	0
December	...	152	4	0	112	4	0	60	4	0

The Cambodia kapas market opened at the rates of Rs. 80/- to 97-8-2 per pothi and closed at the end of the month at Rs. 53/- to Rs. 73-8-0.

The prices of kapas in South Arcot district ranged between Rs. 74-4-0 to 80-4-0 per pothi.

3. **Cotton Seeds:** The price of cotton seeds in Koilpatti Market opened at Rs. 25-8-0 per pothi and gradually advanced to Rs. 25/- in the third week and after a sudden spurt reached Rs. 29/- at the end of the month. The price of Uganda seeds moved between Rs. 19/- to Rs. 25/-.

The price for Karungani cotton seed in the markets of Virudhunagar, Sathur and Rajapalayam which opened at the rates of Rs. 22/- to Rs. 24/- per pothi, closed down at the end of the month at Rs. 24/- to Rs. 26/- per pothi. The price for Uganda seeds, opened at Rs. 15/- per pothi at the beginning of the month, closed at Rs. 21/- to Rs. 23/- at the end of the month. The price for Cambodia cotton seeds was steady during the entire month and was placed at Rs. 16/- to Rs. 17/- per pothi.

II **Groundnut:** (In this Section: Candy = 531 lbs. of Kernels; Bag = 80 lbs. of Pods) The Groundnut markets in South Arcot District opened with a stock of 5,650 tons of Groundnut kernels at the beginning of the month. Total arrivals into the eight regulated markets of South Arcot district amounted to 5652 tons which included 801 tons received from other districts like Coimbatore, Tiruchirapalli etc. and 43 tons received from other States. Disposals for crushing to oil mills and country *chekkus* amounted to 5130 tons and 237 tons respectively. A total of 1484 tons were despatched from this district which included 1482 tons despatched to outside the districts and 2 tons despatched to outside the State. The market closed at the end of the month with a stock of 1770 tons.

The prices of Groundnut kernels in several markets of South Arcot district ranged between Rs. 97-7-0 to Rs. 106-5-0 per candy during the month. The prices of Groundnut kernels in North Arcot district ranged between Rs. 95/- to Rs. 105/- per candy where as the prices of pods ruled at Rs. 8/- to 11-8-0 per bag. The prices in Virudhunagar prevailed at Rs. 110/- to Rs. 112/- per candy of Goundnut kernels.

III. **Gingelly:** (In this Section: Bag = 168 lbs.) The stock of gingelly in all the markets of South Arcot district at the commencement of the month was 946 bags. Receipts during the month in the

five markets amounted to 2362 bags of which 2219 bags were received by Virddachalam market alone. Arrivals from outside the district amounted to 31 bags. Crushing by oils mills and village *chekkus* accounted for 6 bags and 1,204 bags respectively. Disposals by way of despatches to other districts and other States amounted to 1,062 bags and 40 bags respectively and the month ended with a stock of 1,062 bags.

The prices of gingelly in the several markets ruled steady during the month, ranging from Rs. 29-12-0 to Rs. 37-11-0 per bag.

IV. **Coconut and its Products:** 1. *Coconut:* The four markets of Malabar district (namely Kozhikode, Ponnani, Badagara and Tellicherry and Dharmadam) opened with 8·8 million nuts at the beginning of the month. Receipts in all the markets amounted to 8·2 million nuts during the month while disposals by way of despatches and local sales accounted for 7·2 million nuts and 0·3 million nuts respectively. The month-end stock was 9·5 million nuts.

Prices of coconuts as between the different markets ranged during the month from Rs. 70/- to Rs. 128/- per 1,000 husked nuts. The prices in Mangalore Market both for raw nuts and for dry nuts ranged between Rs. 150/- to Rs. 170/- and Rs. 165/- to Rs. 210/- respectively per 1,000 nuts.

2. *Copra:* (In this Section, Candy = 700 lbs.) The two markets of Kozhikode and Badagara of Malabar district started with a carry-over stock of 1,846 cdys. of copra. Arrivals during the month amounted to 3,397 cdys. while despatches accounted for 2,540 cdys. 1,155 cdys. were locally sold leaving at the end of the month a closing stock of 1,548 cdys.

There was good demand from local millers and up-country areas. The prices of copra ranged as between the different varieties in different markets during the month are extracted below:—

Prices in Rs. per cdy.

Varieties	Kozhikode		Badagara	
	Maximum	Minimum	Maximum	Minimum
Office	295	285	295	290
Edible	315	315	320	315
Rajpur	370	365	375	375
Madras	—	—	340	330
Gola	346	330	—	—

Prices of copra in Mangalore Markets ranged between Rs. 290/- to Rs. 335/- per candy of 700 lb.

V. **Arecanut:** (In this Section: Bag = 100 lb.) The stock of arecanut in Mangalore market at the opening of the month was 3078 cwts. and 6,000 cwts. were added to it by way of receipts. Exports during the month amounted to 6420 cwts. leaving a closing stock of 2658 cwts. at the end of the month.

The price ranges of arecanuts in Mangalore markets are indicated below:—

Varieties	*Prices in Rs. per cwt.* Max.	Min.
Choll	190	160
Koka	130	85

The stock of arecanut in Kozhikode and Ponnani markets opened with a quantity of 3,674 bags at the beginning of the month and 12,233 bags were arrived and added with this. Disposals for despatches and local sales amounted to 10,903 bags and 70 bags respectively, leaving a month-end stock of 4934 bags.

The prices of arecanut (*choor*) in Palghat ranged between Rs. 144/- to Rs. 158/- per bag.

VI. **Tobacco:** (In this Section: Candy = 500 lb) The markets in Coimbatore district opened with a stock of 11,776 cdys. of chewing and 6775 cdys. of cheroot tobacco at the beginning of the months. Despatches were mostly to places like Madura, Palghat, Dindigul, Ramnad, Travancore-Cochin State, Tanjore, North Arcot, Malabar, Pudukkottai, Madras, Chittoor, Tiruchirapalli, Tirunelveli and South Arcot amounted to 4115 cdys. of chewing and 2120 cdys. of cheroot tobacco. The markets closed at the end of the month with a stock of 10355 cdys. of chewing and 6350 cdys. of cheroot tobacco.

The prices ruling for different varieties and different grades are extracted below:—

Variety	(Price per Candy) *I Grade* Rs.	*II Grade* Rs.	*III Grade* Rs.
1. *Chewing tobacco - Sun-cured:*			
(a) Meenampalayam	450 to 565	365 to 435	265 to 335
(b) Other varieties	355 to 400	250 to 300	185 to 215

Variety	*I Grade*	*II Grade*	*III Grade*
2. *Cheroot varieties - Sun-cured:*			
Grown in Erode & Bhavani Taluks	280 to 300	225 to 275	160 to 200
3. *Chewing varieties - pit-cured:*			
Grown in Palladam & Sulur areas	210 to 280	140 to 210	70 to 140

State Marketing Officer.

Review of the Activities of Market Committees During September 1955.

1. Of the seven Market Committees in the State, only five, in the districts of North Arcot, South Arcot, Coimbatore, Malabar and South Kanara continued to be actively functioning. The activities of the Committees at Ramanathapuram and Tirunelveli districts continued to be restrained due to the injunction order of the Madras High Court.

2. The following progress was made by the Market Committees during the month in the issue of licences under Madras Commercial Crops Markets Act.

	Section 5(1)		Section 5(3)		Weighmen		Broker	
	A	B	A	B	A	B	A	B
NAMC	60	889	13	370	13	309	—	10
SAMC	198	1653	192	1844	166	1136	4	9
TMC	—	—	—	—	—	—	—	—
CMC	110	466	125	558	93	478	—	7
MMC	13	418	86	1277	14	221	—	5
SKMC	7	220	6	181	—	38	—	—

3. The total volume of transactions in commercial crops in 13 Regulated Markets in the State during September 1955 is extracted below:

Crop		Quantity	No. of regulated markets
Groundnut kernels	...	6,506 tons	8
Gingelly	...	2,257 bags	5
Cotton lint	...	1,041 candies	3
Kapas	...	5,986 pothies	3
	(Candy : = 784 lb ;	Pothi : = 280 lb ;	Bag : = 168 lb.)

II. **Meetings:** A meeting of the Coimbatore Market Committee was held in the office of the Collector of Coimbatore on 29—9—1955, presided by the Collector for the election of the Chairman and the Vice-Chairman.

A meeting of the Committee of Malabar Market Committee was held on 28—9—1955 which was attended by the State Marketing Officer, Madras and Assistant Marketing Officer, Coimbatore. The following were the important subjects considered at the meeting.

1. Decided that By-law 19(b) be substituted with the following viz., the rate of commission for arecanuts including all remunerations for services rendered such as godown rent and other incidental expenses in handling and sale may continue at 4% on the price of arecanuts at Palghat and 3% in other places.

2. As regards amendment to section 2(ii) of the Madras Commercial Crops Markets Act defining the term 'grower', the Committee decided to request the Secretary to examine the definition of the term with reference to Malabar tenancy act and also to obtain legal opinion in the matter in view of the complicated land tenure system obtaining in Malabar.

One meeting each of the Executive Sub-committee and the special sub-committee for draft model by-laws was also held on 17—9—1955.

III. **Quality Appraisal:** The South Arcot Market Committee continued its work on studies of the quality of groundnut kernels marketed in all its regulated markets including Panruti on the basis of random sampling. A total of 528 samples of kernels

was drawn from the arrivals of 23,679 lots of kernels comprising 75,963 bags (bag: 177 lb.) of kernels and each lot was analysed for quality factors. The details of the analysis comprising determination of dry age and total refractions (including (i) dirt and foreign matter (ii) nuts in shell (iii) splits (iv) damaged (v) brokens and (vi) shrivelled) are of interest and are extracted below:

Particulars	Panruti	Cudda-lore	Villu-puram	Tindi-vanam	Tirukoilur	Vridha-chalam
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. *Dryage:*						
2% and below	—	6	—	2	3	73
Above 2% and upto 3%	—	13	1	—	—	36
Above 3% and upto 4%	4	22	4	11	17	18
Above 4% and upto 5%	5	27	4	25	—	11
Above 5% and upto 10%	81	74	31	3	36	—
Over 10%	10	5	3	3	—	—
2. *Total Refraction:*						
4% and below	7	36	6	14	28	117
Above 4% and upto 8%	86	92	22	20	25	18
Above 8%	7	19	15	10	3	3

The total common refraction was below 4% in 208 samples, 5 to 8% in 263 samples and above 8% in 57 samples. In respect of dryage Cuddalore, Tirukoilur, Villupuram and Panruti recorded higher percentages ranging between 6 and 10% in 74 samples, 36 samples, 31 samples and 81 samples respectively. Out of 147 samples, 56 and 43, out of 100 samples analysed in the markets of Vridhachalam and Tindivanam respectively accounted for low moisture content in more than 50% of the samples.

233 entries were secured during the month for the summer crop quality competition in groundnut kernels marketed in South were secured Arcot district.

State Marketing Officer.

Review of Market Conditions of Commercial Crops in the Areas of Market Committees for October, 1955

1. **Cotton Stocks:** 1. *Tiruppur:* (In this section = 784 lb; Pothi = 280 lb.) *Lint:* The cotton market at Tiruppur started with a stock of 8,278 candies of Cambodia and 3,913 candies of karunganni lint in the month. Arrivals during the month amounted to 4,934 candies of cambodia and 2,166 candies of karunganni lint as against 4,189 candies of Cambodia and 1,176 candies of karunganni lint during the previous month. The arrivals include 769 candies of Cambodia and 56 candies of karunganni lint ginned locally. Despatches from Tiruppur were 6,946 candies of Cambodia and 2,547 candies of karunganni lint sent to Travancore-Cochin State, Bombay, Orissa and to districts within the State. The market closed with a stock of 6,266 candies of Cambodia and 3,532 candies of karunganni lint at the end of month.

Kapas: The kapas market of Tiruppur started with an opening balance of 8,002 pothies of Cambodia and 1,990 pothies of karunganni during the month. Arrivals in the month accounted for 12,672 pothies of Cambodia and 142 pothies of karunganni as against 10,408 pothies of Cambodia and 2,472 pothies of karunganni during the previous month. Disposals during the month amounted to 13,444 pothies of Cambodia and 819 pothies of karunganni kapas. There was a closing stock of 7,230 pothies of Cambodia and 1,313 pothies of karunganni.

Koilpatti: The market at Koilpatti started with a nil balance. There were arrivals of 1,000 pothies of Uganda kapas as against the same quantity during the previous month. The arrivals were entirely ginned and there was no stock as kapas at the end of the month. However, about 633 candies of lint is estimated in stock with the trade at the end of the month.

Due to floods in cotton growing tracts in North India the off-take for local cotton by the mills (local) was brisk.

Ramanathapuram district: *Lint:* The three markets of Virudhunagar, Sathur and Rajapalayam put together opened with a stock of 1,650 candies of Uganda. Arrivals in the month were 3,565 candies which include 880 candies of karunganni, 1,980 candies of Uganda and 705 candies which of Cambodia as against 6,910 candies in all during the previous month. Disposals in the month amounted to 4,120 candies which consisted 1,335 candies of karunganni 2,080 candies of uganda and 705 candies of cambodia. These markets

closed with a stock of 1,095 candies (345 candies of karunganni and 750 candies of uganda) at the end of the month.

Kapas: The kapas markets started with 7,000 pothies consisting of 300 pothies of karunganni 6,500 pothies of Uganda and 200 pothies of Cambodia. Arrivals during the month were 9,800 pothies including 1,400 pothies of karunganni, 5,650 pothies of Uganda and 2,750 pothies of Cambodia as against 29,850 pothies in all during the preceding month. About 13,350 pothies, comprising 1,600 pothies of karunganni, 9,150 pothies of Uganda and 2,600 pothies of Cambodia were estimated to be the disposals during the month, leaving a carry-over stock of 3,450 pothies which consisted 100 pothies of karunganni, 3,000 pothies of Uganda and 350 pothies of Cambodia at the end of the month. Though the demand from mills for Uganda kapas was good, demand for lint was not much.

South Arcot district: The markets of South Arcot district opened with a stock of 34 pothies of kapas during the month. During the month 3,339 pothies of kapas arrived in the various markets as against 870 pothies during the previous month. Despatches, in all, took away 3,120 pothies leaving a closing stock of 253 pothies at the end of the month.

Cotton prices: Lint: Tiruppur: The cotton market in general was dull due to slackening of the season. The prices of Cambodia lint fluctuated between Rs. 870/- and 981/- per candy as among the different qualities. Transactions in respect of karunganni lint were limited during this month and the prices ruled steady which stood at Rs. 730/- per candy.

Koilpatti: Prices of cotton lint at Koilpatti market have shown a little rise during this month on account of demand from the local millowners. Transactions ranged between Rs. 700/- and Rs. 720/- for first quality of first crop of karunganni and Rs. 600/- and 680/- per candy for the second quality. Inferior types varied round Rs. 525/- to Rs. 550/- per candy. Prices of Uganda lint remained steady around Rs. 1,120/- per candy for the certified quality and Rs. 900/- to Rs. 1,000/- per candy for uncertified quality.

Ramanathapuram district: The cotton lint marketed in the three centres of Virudhunagar, Sathur and Rajapalayam opened at the rates of Rs. 682/- for K-2 karunganni, Rs. 646/- to Rs. 655/- for first crop, Rs. 580/- to Rs. 630/- for first and second crop mixture, Rs. 520/- to Rs. 570/- for second crop and Rs. 466/- to Rs. 520/- for tinny. The prices gradually increased to Rs. 700/- to Rs. 726/- for

K-2 karunganni, Rs. 660/- to Rs. 686/- for first crop, Rs. 620/- to Rs. 650/- for first and second crop mixture, Rs. 560/- to Rs. 610/- for second crop and Rs. 480/- to Rs. 550/- for tinny. The Uganda lint opened at the rates of Rs. 1,191/- to Rs. 1,216/- per candy for MU 2 certified, Rs. 1,090/- to Rs. 1,116/- for MU 1 certified and Rs. 986/- to Rs. 996/- for uncertified and the rate was steady till the third week of the month. The prices of Cambodia lint ruled more or less steady and were placed at Rs. 600/- to Rs. 630/- per candy for low types and Rs. 700/- to Rs. 725/- for the good quality.

Kapas: Tiruppur: The prices of Cambodia kapas at Tiruppur market were Rs. 116/- to Rs. 121/- per pothi during the month. Due to the variations in the quality of Cambodia cotton, the chief arrivals were from South Arcot and Salem districts. Prices of karunganni kapas were ranging between Rs. 80/- and Rs. 86/- per pothi.

Koilpatti: During the month in the market no transactions took place in respect of kapas.

Ramanathapuram district: The kapas price for karunganni variety in the three markets of this district opened at the rates of Rs. 80–8–0 to 84–0–0 per pothi for first crop; Rs. 64–4–0 to 75–12–0 for second crop and Rs. 48–12–0 to 56–12–0 for tinny. The prices gradually increased to Rs. 84–8–0 to 81–6–0 for second crop and Rs. 52–8–0 to 65–0–0 for tinny. The increasing local demand in the absence of adequate stocks to meet the requirements has caused the rise in the prices. Prices in respect of Uganda kapas opened at the rates of Rs. 122–8–0 to 133–0–0 for best quality and Rs. 96–0–0 to 118–0–0 for second quality. The prices have registered some improvement in latter part of the month. Prices for M. U. 2 seed farm kapas ruled at Rs. 140–0–0 to 148—14—0 per pothi. The Cambodia kapas which opened at the rates of Rs. 52–8–0 to 78–12–0 increased to Rs. 52–8–0 to 87–8–0 in the middle of the month and then declined to Rs. 48–0–0 to 78–14–0 per pothi at the end of the month.

South Arcot district: The average price of kapas in the different markets of South Arcot district ranged from Rs. 74 to 74–4–0 per pothi.

Cotton seeds: Koilpatti: The price of karunganni seeds and Uganda seeds were firm during this month at Rs. 30 and Rs. 23 to 25 per pothi respectively.

Ramanathapuram district: The prices of karunganni seeds in the three markets of this district opened at the rates of Rs. 27–0–0 to 29–0–0 per pothi of 252 lb, decreased gradually to Rs. 25–8–0 to 28–4–0 at the close of the month. Prices of Uganda seeds opened at the rates of Rs. 23–0–0 to 24–0–0 and closed at Rs. 21–8–0 to 23–0–0 per pothi of 252 lb. The prices of Cambodia cotton seeds opened at the rates of 17–0–0, prevailed at Rs. 20–8–0 to 21–8–0 in the middle of the month and closed at lower rate at Rs. 19 to 20 at the end of the month.

2. **Groundnuts:** (Candy in this section means 531 lb. of kernels and bags = 80 lb. of pods).

Stocks: The groundnut markets in South Arcot district started with an opening balance of 1770 tons of groundnut kernels at the commencement of the month. Arrivals into the eight regulated markets of South Arcot amounted to 6,037 tons which ncluded 1,201 tons and 9 tons received from other districts and States respectively. The receipts were mostly from Coimbatore and Tiruchirapalli and from Andhra. Crushings both by oil mills and country *chekkus* accounted for 4,317 tons and 224 tons respectively. There were some despatches to other districts like Tanjore, Madurai, Tiruchirapalli, Chingleput, Salem, Ramnad etc. which accounted for 1,149 tons. A quantity of 191 tons were locally disposed of as wastage. The month closed with a stock of 3,116 tons.

Prices: (a) The average price of groundnut kernels marketed in South Arcot district ranged from Rs. 93–8–0 to 105–8–0 per candy.

3. **Gingelly:** (In this section: bag = 168 lb.)

Stocks: The markets of South Arcot district opened with a stock of 1,062 bags of gingelly at the beginning of the month. Receipts into the five markets of South Arcot district amounted to 5,327 bags of which 5,215 bags were received by Virdhachalam market alone. Receipts from Tiruchirapalli district amounted to 427 bags. Country *chekkus* and mills crushed 1,508 bags and 13 bags respectively for oil. Despatches to other districts in the month were 3,849 bags, leaving a closing stock of 1,446 bags at the month end.

Prices: The average price of gingelly marketed in the several markets of South Arcot district ranged from Rs. 37–0–0 to 43–4–0 per bag.

4. **Coconut and its products:** (In this section: Candy: = 700 lb.)

Stocks: The four markets of Malabar district (viz. (i) Kozhikode, (ii) Ponnani, (iii) Badagara and (iv) Tellicherry and Dharmadam) opened with 9·6 million nuts at the commencement of the month and 8·3 million nuts were added to this by arrivals. Despatches and local sales were 8·2 million nuts and 1·1 million nuts respectively, and the month closed with a stock of 9·2 million nuts.

Prices: (a) Prices of coconuts as between the different markets ranged between Rs. 80 and 123–8–0 per thousand nuts.

(b) Prices in Mangalore for coconuts, both for raw and dry nuts, stood at Rs. 145 to 170 and 165 to 215 per thousand nuts respectively.

Copra: Stocks; The two markets of Kozhikode and Badagara started with a carry-over stock of 1,548 candies at the beginning of the month and 4,208 candies arrived during the month. Disposals by way of despatches and local sales amounted to 2,207 candies and 1,520 candies respectively leaving a closing stock of 2,029 candies at the month end.

Prices: The demand for copra from the up-country areas was steady during this month also. The price ranges as between the different qualities and different markets are extracted below:

	Kozhikode		Badagara	
Varieties	Maximum	Minimum	Maximum	Minimum
Office	295	262	295	288
Edible	325	315	320	320
Rajpur	375	360	375	365
Madras	330	320	325	320
Gola	345	330	N. F.	N. F.

(N. F.: Not furnished)

(b) The prices of copra in Mangalore ranged at Rs. 280 to 325 per candy.

5. **Arecanut:** (In this section : Bag = 100 lb.)

Stocks: Malabar district: The two markets of Kozhikode and Ponnani started with an opening stock of 4,934 bags in the month. Receipts in the month amounted to 9,448 bags while the disposals accounted for 9,189 bags both by way of despatches and local sales, the majority being the despatches. There was a closing stock of 5,193 bags at the end of the month.

Mangalore Market: The stock of arecanut *(Supari)* in Mangalore market at the beginning of the month was 2,658 cwts. 12,800 cwts. was added to this from out of receipts. Exports during the month amounted to 13,500 cwts, leaving a closing stock of 1958 cwts. in the end.

Prices: Malabar district: The prices of arecanuts *(choor)* in Palghat ranged from Rs. 146 to 160 per bag.

Mangalore: The price ranges of arecanuts as between the different varieties in Mangalore market are extracted below :—

(Price in Rs. per cwt.)

Varieties	Minimum	Maximum
Koka	05	130
Choll	165	190
Malabar Supari	105	135
Mangalore Supari	112	158

6. **Tobacco:** (In this section: Candy = 500 lb).

Stocks: The markets in Coimbatore district opened with a stock of 10,355 candies of chewing and 6,350 candies of cheroot tobacco at the beginning of the month. Despatches during the month amounted to 2,453 candies of chewing and 1,390 candies of cheroot tobacco mostly to Malabar, Tanjore, North Arcot, South Arcot, Madras, Chittoor and Travancore-Cochin State. The markets closed at the end of the month with a stock of 9,786 candies of chewing and 3,450 candies of cheroot tobacco.

There was a slight recession in the prices in respect of superior varieties. The price range for different varieties are extracted below :—

(Prices in Rs. per candy)

Variety	I grade Rs.	II grade Rs.	III grade Rs.
1. *Chewing tobacco – sun-cured:*			
(a) Meenampalayam	435–500	350–400	250–320
(b) Other varieties	330–375	245–260	155–200
2. *Cheeroot varieties:*			
Sun-cured (grown in Erode and Bhavani taluks)	335–400	280–335	165–225
3. *Chewing varieties:*			
Pit-cured (grown in Palladam and Sulur areas)	210–280	140–210	70–140

Review of the Activities of the Market Committees during October, 1955

Of the seven Market Committees in the State, only five, in the districts of North Arcot, South Arcot, Coimbatore, Malabar and South Kanara continued to function actively. The activities of the other two Market Committees viz. Ramanathapuram Market Committee and Tirunelveli Market Committee continued to be restrained on account of some legal aspects.

The following progress was made by the Market Committees during the month in the issue of licences under Madras Commercial Crops Markets Act.

	Section 5(1)		Section (5)		Weighmen		Broker	
	A	B	A	B	A	B	A	B
NAMC	--Report not received--							
SAMC	275	1928	264	2108	319	1455	—	9
TMC	—	—	—	—	—	—	—	—
CMC	121	587	131	689	118	596	—	7
MMC	9	498	99	1348	6	213	—	5
SKMC	6	226	4	185	2	40	—	—

The total volume of transactions in commercial crops in 13 regulated markets in the State during October 1955 is extracted below:—

Crop	*Quantity*	*No. of regulated markets*
Groundnut kernels	5,371 tons	8
Gingelly	3,930 bags	5
Cotton lint	799 candies	3
,, kapas	4,612 pothies	3

(bag = 168 lb; Candy = 784 lb; Pothi = 280 lb.)

Meetings: The first meeting of the Coimbatore Market Committee was held on 19—10—1955 when fourteen subjects were discussed. The committee in a resolution, appointed a sub-committee comprising of three members including the Chairman to consider the extension of the Market yards to Pollachi and Gobichettipalayam. The sub-committee also met at Pollachi on 31-10-1955.

A meeting of the South Arcot Market Committee was held on 31-10-1955 when 12 subjects were disposed off out of 39 subjects.

One meeting each of the Main Committee and appointment sub-committee of Malabar Market Committee was held on 28-10-'55.

Among the several subjects considered by the Committee the important ones are extracted below:

(a) Seeking permission of the Government through the Director of Agriculture to visit Bangalore, Bowringpet, and Shimoga of Mysore State by the Chairman and the Secretary of the Market Committee to contact the arecanut traders there about the new regulated market opened by the Committee.

(b) Opening of two weighing centres for arecanut at two places in Ponnani taluk on obtaining Government sanction.

(c) Sanction for revised estimate for 1955 and budget estimate.

Quality appraisal: The analysis of the quality of the groundnut kernels was continued to be done by the South Arcot Market Committee. A total of 445 samples of kernels was drawn from arrivals of 11,107 lots of kernels in 55,562 bags (bag = 177 lb.) was analysed for quality factors. The details of analysis are extracted below:

Particulars	Cuddalore	Villupuram	Tindivanam	Vridhachalam	Panruti	Tirukoilur
1. *Dryage:*						
2% and below	3	—	—	54	1	4
Above 2% & upto 3%	13	—	—	36	—	—
,, 3% ,, 4%	26	—	17	10	10	11
,, 4% ,, 5%	23	—	13	18	15	—
,, 5% ,, 10%	74	24	7	—	59	15
,, 10%	5	—	—	—	7	—
2. *Total refraction:*						
4% & below	8	—	12	75	1	12
above 4% & upto 8%	90	17	19	40	87	8
above 8%	46	7	6	3	4	10

Out of the 445 samples analysed, 108 samples accounted for refraction reduced to a common basis within 4%, 261 samples within 5 to 8% and 76 samples above 80%. Dryage was at its minimum at Vridhachalam, as also refraction in general. Both dryage and refraction was moderate at Tirukoilur and Tindivanam, while they were high at Cuddalore and Panruti.

Twelve entries were secured for the summer crop and winter crop quality competition in groundnut kernels marketed in South Arcot district.

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Editorial

An appeal to our readers: It is well-known that editors are a much-maligned lot, but most of them, at least in their lucid intervals, have got only the interest of their readers uppermost in their minds. And it goes without saying that the best test of the reader's interest in any periodical lies in the volume of correspondence coming on to the Editor's desk and the contributions that come in for publication in the periodical. Judged by this test, it has to be confessed that a certain degree of imbalance appears to exist in the contributions that are received nowadays for publication in the Madras Agricultural Journal. As the very name indicates, the journal is intended to serve the needs of all those interested in Agriculture, both by way of supplying scientific information to agricultural workers and serving as a medium for the exchange of agricultural knowledge between different regions in Madras State. Though the journal can claim that it has been and still is fulfilling the former need, at least within the limitations that still persist, the latter aspect seems to need a great deal of improvement. For this improvement, it is only our readers and members of the Madras Agricultural Students' Union who can help, by sending in larger numbers, short notes or articles on all matters of agricultural interest. It is inconceivable that in such a vast field as agriculture, there should any dearth of interesting material, provided the desire is present, to make known the information available to a larger circle. A review of the previous volumes of the Madras Agricultural Journal shows that in the earlier years, a much larger proportion of the contributions used to come from workers in the districts than is the case now. It is immaterial to enquire whether this shift in the relative proportion of contributions from the research and the extension wings is due to the latter

being entrusted now with many more items of work than in the earlier years, or whether the research people are better placed in regard to the collection and presentation of information in a form that is readily acceptable for publication. Whatever the reasons might be, it is very desirable that the balance should be rectified as much as possible. With this end in view an appeal is now made to all our readers and well-wishers to send in as many contributions as possible, for publication in the Madras Agricultural Journal. These contributions need not necessarily be in the form of full-fledged "original articles", but may include any item of interest, of peculiar agricultural practices that are current in different regions, new ideas, or suggestions to improve existing practices or information regarding new uses of familiar plants, implements or chemicals. In fact, it may be said that the field of choice need have no limitations at all but might cover any or all items that are likely to be of interest to workers in practical agriculture and in the agricultural sciences.

It is hoped that a larger number of such notes would be forthcoming during the next year for publication in our Journal.

Price of Groundnuts in North Arcot District

by

S. K. SRIRAMAN, B. Sc., (Ag.) M. Sc.

Introduction: The fruits of the tropical to sub-tropical annual plant "*Arachis hypogea*" are popularly called the "Groundnuts" or "Earthnuts" as the nuts mature under the ground surface. The kernels inside the pods resemble peas and hence are also termed as "peanuts". There is yet another name for this, as "Monkey nuts" since monkeys in zoos, are fed by the spectators with these nuts. This last name has really assumed more significance of late, because of the rapid fluctuations in the prices of the same. The prices are as varying and erratic as the actions of a monkey. The month-war prices of groundnuts in North Arcot district are given in statement I appended, from 1935 onwards. A glance at the figures reveals that the trend of groundnut prices for the past twenty years has been a story by itself, full of interest and excitement.

Price Fluctuations: The price of groundnuts ruled round about Rs. 30 to 40 before World War II. What was only Rs. 25 per candy of 531 lb. groundnut kernels (shelled) at the beginning of the war in 1939, began to move up gradually and reached nearly rupees one hundred at the end of the war in 1946. In the post-war boom period, the prices shot up and aided by other conditions like the Korean war, groundnuts were sold at Rs. 220/- by 1951. There was a rapid decline in 1952, reaching Rs. 120/-. Again due to drought conditions, the prices spurted up to Rs. 230/- in 1953. Thereafter the story took a sad turn, and the prices declined rapidly month after month. The downward march continues still and it is time that the various factors responsible for the price structure of groundnuts are studied. The results of a preliminary survey of facts in North Arcot are presented in this article for focussing attention on the various aspects of this important problem.

Market Price: Many economists have tried to solve the riddle of determining the value of a commodity and yet the forecast of the value of a commodity, is in practice rather difficult. There were many old theories regarding value. The labour theory and the Marxian theory of value, stressed that the value of a commodity was determined by the amount of labour embodied or expended in it. The value was recognised later in terms of the cost of production. The utility

theory determined the value of the produce in terms of the utility of the commodity. This was later modified and the utility of that unit which the consumer was first induced to buy, in short called the "marginal utility", was considered the sole factor in determining value. Value, demand and supply are interrelated. Finally, it can now be stated that the value is determined for a particular commodity in the market by the equilibrium of the forces of demand and supply. The influence of the cost of production cannot also be ignored in determining the price. Having recognised the broad principles determining value, how they operate in the case of groundnuts grown in North Arcot district would be the next study.

Production: Groundnut production is virtually the monopoly of India and China. Out of a total of ten million tons of pods produced annually in the entire world, three million tons are accounted for in each of the countries, India and China. The United States of America, Senegal and Nigeria of West Africa are the only other countries producing some sizeable quantities. India figures prominently in the groundnut trade of the world. Of late, the policy in India is to allow exports mostly of groundnut oil only, instead of pods or kernels in order to develop the oil-milling industry in this country, besides retaining the valuable byproduct, the groundnut cake, for utilisation as cattle feed or as an organic manure. In China, the next best producer of groundnuts, the home market is of greater importance than the export market. Hence, the Indian production plays a significant part in the world trade of groundnuts.

Out of the production of three million tons of pods in India, roughly one-fourth is grown in Madras State. Andhra, Bombay and Hyderabad are the only other States worth mentioning as producers of groundnuts. Amongst the districts in Madras State, South Arcot and North Arcot are the two districts that produce the maximum amount of groundnuts, each accounting for one and a half lakhs tons of pods. The importance and the magnitude of the problem can be gauged from the above position.

Cost of Production: Let us now examine the economics of producing this commodity in the North Arcot district. Assessing the cost of production is beset with innumerable difficulties, as conditions differ from place to place. A rough idea for the entire district is presented below, after making proper enquiries in numerous places. The details of the cost of cultivation are as follow :—

Cost of cultivating one acre of groundnuts (Spreading variety) in North Arcot districts during 1954

		Rs.	A.	P.
Preliminary Cultivation:				
Three ploughings at 3 pairs per ploughing (at one rupee per pair of cattle and a man.)	...	9	0	0
Manuring:				
10 cartloads of farmyard manure (at Rs. 2/- per cartload including transport to field and spreading.)	...	20	0	0
Seeds and Sowing:				
30 M. M. of kernels at Rs. 1/- per M. M.	...	30	0	0
One ploughing for sowing the seeds (3 pairs at one rupee each.)	...	3	0	0
Three women to dibble the seed (at Rs. 0–8–0 each woman.)	...	1	8	0
Note: The crop germinates by about the eighth day.				
Intercultivation:				
First weeding or hoeing (about the 20th day after germination) ... 8 women. (at Rs. 0–8–0 per woman.)	...	4	0	0
Second weeding or hoeing (about the 50th day after germination) ... 8 women. (at Rs. 0–8–0 per woman.)	...	4	0	0
Harvesting:				
One watchman for the final month who will look after 6 acres on a daily wage of Rs. 0–12–0.)	...	3	12	0
Harvesting the pods ... 25 women (at Rs. 0–8–0 each) if paid in money. In some places, the wages are paid in kind at the rate of 1:10 to 13 which would work out to roughly 1½ bags of pods and the money value is the same. In some other places, the women are paid Rs. 0–0–9 for picking one marakkal of 4 M. M. pods, which also comes to the same amount.)	...	12	8	0
Total expenses per acre	...	87	12	0

Income:

Haulms $1\frac{1}{2}$ cartloads (used for feeding cattle.)	...	8 0 0
15 bags of dried groundnut pods are obtained from one acre. (1 bag = 80 lb.)		

Note: The bunch variety, which is rapidly spreading in this district, replacing the spreading variety of groundnut, requires 40 M. M. of seeds instead of 30 M. M. and for harvesting would require only 15 women instead of 25 women. The yield is only about 12 bags instead of 15 bags. In all other respects, the cultivation expenses are the same.

Thus the cost of cultivation of groundnuts works out to Rs. 80/- per 15 bags of dry pods or Rs. 16/- per bag of kernels (equivalent to three bags of dry pods).

Market expenses and price-spread: Next to the cost of production, let us estimate the marketing expenses. The traders in this district, purchase groundnuts from the producers either through brokers or commission agents. The main marketing season for groundnuts is between September to December every year. The prices during these months are naturally lower, as can be seen from the monthly averages given in Statement I. However, during some periods, because of other factors like the war, the prices did not vary according to the season (Statement I).

The pods purchased from the growers are dried and decorticated before being sold as kernels to the exporters or the oil crushers. A study of the "price spread" of groundnuts, would give us an insight into the marketing expenses to be incurred. Here again, because of the various deviations in the method of marketing groundnuts, the working out of the "price spread" is difficult. A rough idea is given below, taking into consideration the majority of conditions in North Arcot district.

Price-spread from producer to consumer in the marketing of groundnuts in North Arcot district.

(a) *Purchases by itinerant merchants:*

		For one bag of 177 lb. groundnut kernels. Rs. A. P.
Producer's price for $3\frac{1}{2}$ bags of wet pods (64 M. M. each) at the village farm at Rs. 8/- per bag of wet pods	...	28 5 0

Note: $3\frac{1}{2}$ bags of (64 M. M. each, weighing roughly 100 lb.) wet pods 3 bags (80 lbs. each) of dry pods and will yield 1 bag (177 lb.) of kernels.

Cost of drying and bagging the pods ...	0	5	0
Handling and cartage charges from village to assembling centre from a place roughly 5 miles distant ...	0	12	0
Decorticating charges to get 1 bag of kernels ...	0	6	0
Weighing and stitching charges at the decorticator, for one bag of kernels ...	0	1	0
Margin for the itinerant merchant ...	1	0	0
Value realised by the itinerant merchant ...	30	8	0

(b) *Sales through a commission mundy :*

	Rs.	A.	P.
Commission at Rs. 0—0—6 per bag of kernels (after the advent of the marketing regulation under the Madras Commercial Crops Markets Act) ...	0	2	6
or			
Commission at Rs. 0—0—6 per rupee and other charges from buyer (before the advent of the regulation) ...	1	0	0
Weighing and handling charges ...	0	1	0
Sales tax to be paid by the purchaser ...	0	8	0
Levy to the market committee ...	0	1	6
Transport to the purchaser's godown ...	0	1	0
Total cost for the consumer-exporter or the oil-mill owners before regulation under the Madras Commercial Crops Markets Act ...	32	3	6
After regulation under the Madras Commercial Crops Markets Act ...	31	6	0

(c) *Sales through the regulated markets directly by the growers :*

	Rs.	A.	P.
Cost of drying and bagging the pods (own labour) nominal, ...	0	4	10
Handling and cartage charges from village to the regulated market, which is mostly his own (labour) nominal cost. ...	0	8	0
Decorticating charges ...	0	6	0
Handling charges at the regulated market (weighing free) ...	0	0	8
Levy to be paid to the Market Committee by the purchaser. ...	0	1	6

Transport charges to the purchaser's godowns	...	0	1	0
The producer receives for his $3\frac{1}{2}$ bags of wet pods-nett	...	30	0	0
Total cost for the consumer in North Arcot district	...	31	6	0

Only small quantities are utilised in this district for crushing into oil. Out of a normal production of 1 lakh tons of kernels in North Arcot district 85,000 tons are available for marketing either for crushing into oil or for export. The oil-crushing capacity of the existing installations in this district is roughly 72,000 tons kernels, while the actual quantity crushed is only about 20,000 tons. Thus, in spite of having facilities for developing a good oil-crushing industry in this district the shyness of capital, the vagaries of the kernel prices, and the absence of parity between the prices of kernels and oil, has undermined the oil-milling industry in this district. Hence nearly 65,000 tons are exported, mostly to the nearby milling centres in South Arcot district or to the exporting centre, Madras.

(d) *Expenses for export to Madras from North Arcot district.*

		Per bag of 177 lb. kernels		
		Rs.	A.	P.
Lorry hire charges (about 75 miles)	...	1	0	0
Expenses for the party at Madras	...	0	6	0
Commission at 1%	...	0	6	0
Weighing, handling and stitching charges at Madras	...	0	3	0
Sales tax paid by the purchaser at Rs. 0—0—3 per rupee	...	0	8	0
Total	...	2	7	0
Consumer's cost at Madras after regulation	...	33	13	0

The above price-spread data reveal that out of Rs. 33—13—0 the producer in North Arcot district receives only Rs. 28/- when he disposes it off through the brokers and commission mundies under the present conditions of regulation of groundnut trade in North

Arcot district under the Madras Commercial Crops Markets Act. If the producer sells his produce through the nearest regulated market, he gets Rs. 30—0—0 out of the consumer's price of Rs. 33—13—0 per bag (177 lbs.) of kernels. Thus nearly 89% of the consumer's rupee goes to the share of the producer, if he should market his produce directly through the regulated markets, while he gets only 83%, if it is sold through brokers and commission agents. The case was still worse, before the regulation of trade, when the producer got only 81% of the consumer's rupee as his share. Nearly two and a half rupees are lost per bag of kernels transported to Madras. This can be saved, if utilised within the district, by crushing into oil. Nearly two rupees more per bag of kernels is realised by the producer, if he should market his produce through the regulated markets instead of the commission mundies in North Arcot district itself. Hence, there is scope for improving the price paid to the grower in North Arcot district. The producer when encouraged, would naturally try to produce more and more. Finally the price-spread data reveal that the expenses of marketing are Rs. 0—14—0 within North Arcot district and Rs. 2—7—0 for sale at Madras, which amounts to Rs. 3—5—0 per bag of 177 lb. kernels.

Parity Price: Groundnut is the money crop for the dryland cultivator in this district and only one crop of groundnut is raised between July to October. The other crops like Cholam raised by him during the other seasons are used for domestic consumption. Hence, the ryot depends upon the groundnut crop for meeting his capital expenses, for marriages or death ceremonies or for purchasing his cloth and other requirements. These factors also have to be considered, along with the cost of cultivation and marketing expenses for determining the price of groundnuts. A dry-land ryot of North Arcot district normally cultivates about four acres of groundnuts per annum, and allowing for his capital expenses of about Rs. 300/- per annum the extra value of groundnuts per bag of kernels works out to Rs. 5/-. Hence the value of groundnuts should be about rupees one hundred per candy of 531 lbs. of kernels (3 bags). The present price of ninety rupees is low and the ryots are naturally disappointed. This will have its own repercussions on the succeeding crop of groundnuts, whose area may be less. Hence, unless the price of groundnuts is maintained at about the level of rupees one hundred per candy of kernels, the incentive to produce groundnuts on a large scale may be hampered.

Supply and Demand: After the considering of the cost of production and marketing expenses, the supply and demand position should be examined to get at the reason for the fluctuation in prices. The prices in North Arcot district closely follow the prices at Madras as there is very little utilisation and consumption of groundnuts locally. In the pre-war years, before 1939, the Madras prices used to be largely influenced by the buying limits of the chief exporting firms like the East Asiatic, Louis Dreyfuss, Rallies etc., and as these were based on the London prices, there was generally close sympathy between the movement of prices at Madras and London. The London price for groundnuts used to move parallel to those of several other edible oilseeds and oils. The control over the exports, the expansion of the oil-crushing indtstry in Madras State and the establishment of the Vanaspathi manufacturing factories in India, upset the prices in India itself, and the prices at London, the hub of the World groundnut trade, no longer continued to be the deciding factor for the prices of groundnuts in Madras during and after the World War II. Of late, owing to the dearth of capital and over-production, the prices in India have tended to follow the London market once again. Hence, the supply position of not only groundnuts but also other oilseeds like castor, copra and gingelly is vital in the decision of the groundnut prices. The Indian crop alone does not compete, as other countries also have of late begun to compete in the London market. Hence, the prices fluctuate abnormally.

The meteoric rise in prices during and since the World War II is a phenomenon common to all agricultural products.

Fair Price for Groundnut: The price index number of the groundnut kernels at Vellore (North Arcot district) taking the price in 1938–39 as 100 and the comparison with the price index numbers of other commodities produced in North Arcot district, showing the parity in prices between the various commodities, is given in statement II.

It is found that the price index number of paddy in 1954–55 is 420, while the groundnut pods index is 431 and that of jaggery is only 164. The present price of first sort paddy which is about Rs. 10—8—0 per imperial maund is reported to be just about the economic level and measures are being suggested for stabilising the prices, by fixing floor price just about the present level. Hence, it can be taken as an indication that a price index level of about 420,

would be ideal, for forming an idea of the fair price of the other commodities also. By this standard, the price of groundnut pods should be about Rs. 11/- per bag of 80 lb. At this price, there would be parity between the price of paddy and the groundnut pods. Hence, the fair price of groundnut kernels from this angle also works out to Rs. 100/- per candy of 531 lb. (9 bags of pods.)

Conclusion: Having discussed the reasons for the fluctuation in prices, the remedies, if any for stabilising prices may be thought of. The violent fall in prices at harvest time is a matter of serious consequence to producers. To minimise its effects, co-operative societies and bonded warehouses can be set up for providing storage and finance to the cultivatiors; and regulated markets can be established for affording proper facilities for marketing their produce at favourable prices and to disseminate market news about prices, stocks and demand. The introduction of organised "futures" trading in the spreading variety, "Coromandel", at Madras would help in bringing the influence of supply, demand and international values, to bear more closely on Madras prices and prove beneficial to producers. Fixation of "floor" and "ceiling" prices at Rs. 100/- and Rs. 150/- respectively per candy of 531 lbs. kernels, may also help in stabilising the prices. Greater use of groundnut oil in India itself for industrial purposes like the manufacture of soaps, cosmetics, and Vanaspathi should be a stabilishing factor in the marketing of groundnuts. Provision of improved shipping facilities by the Government of India would further improve marketing conditions. Greater provision of loans on groundnuts by banks, would also stem the fluctuations to a large extent.

STATEMENT I

Price of groundnut kernels in North Arcot District

(Rs. per candy of 531 lbs.)

Pre-war Period

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year average
1935	39	35	37	40	38	38	39	37	35	36	34	35	37
1936	37	35	35	33	33	35	36	40	30	36	40	40	36
1937	38	38	38	35	35	36	36	39	30	28	25	28	33
1938	27	26	25	25	26	26	27	24	20	22	23	26	26
Month average	35	34	34	33	33	34	35	35	30	31	31	32	

					World War II								
1939	25	24	22	23	28	27	28	32	30	29	31	31	28
1940	30	30	30	32	35	36	27	24	22	25	20	19	28
1941	21	18	20	23	24	27	31	34	25	26	31	33	26
1942	32	33	31	32	28	33	43	47	40	50	48	50	39
1943	60	65	75	82	89	90	87	81	82	82	78	75	78
1944	73	70	76	78	71	66	66	69	74	69	63	58	69
1945	63	63	65	54	58	56	65	75	79	74	74	76	67
1946	88	90	90	90	95	92	90	96	96	90	90	92	90
Month average	49	49	51	52	54	53	55	57	56	56	54	54	
					Post.war Period								
1947	79	85	110	130	130	125	130	150	140	120	125	132	121
1948	136	130	126	136	136	140	140	144	142	145	142	145	139
1949	145	147	155	165	165	166	170	176	173	170	165	163	163
1950	165	160	170	195	191	190	192	190	185	188	187	200	185
1951	218	211	215	215	215	220	205	190	182	180	187	172	202
1952	170	160	120	130	125	120	120	135	140	151	160	160	140
1953	165	168	180	192	203	230	210	185	166	165	164	160	180
1954	160	156	160	160	148	135	130	125	105	105	99	104	132
Month average	155	153	155	165	164	166	162	162	154	153	154	154	
1955	95	97	94	93	90	90							

Source: Collected from the traders' accounts.

STATEMENT II

Price Index Nos. for important agricultural commodities in North Arcot District

Year	Paddy Ist sort	Groundnut pods	Cane Jaggery
1938—'39	100 (Rs. 2—8—0)	100 (Rs. 2—10—0)	100 (Rs. 7—0—0)
1939—'40	108	121	90
1940—'41	122	91	51
1941—'42	135	126	80
1942—'43	180	275	175
1943—'44	265	319	137
1944—'45	213	255	124
1945—'46	270	329	159
1946—'47	260	469	238
1947—'48	275	588	157
1948—'49	1,115	610	204
1949—'50	393	712	334
1950—'51	440	688	314
1951—'52	492	674	200
1952—'53	470	681	253
1953— 54	378	679	275
1954—'55	420 (Rs. 10—8—0)	431 (Rs. 11—5—0)	164 (Rs. 11—8—0)

Base: Year ended June 1953 = 100.

Effect of indirect manuring on the yield of broadcast Rice in Malabar

by

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Introduction: In Malabar for autumn rice, occupying about three lakh acres in double-crop lands, broadcast sowing is the rule in more than 75 per cent of the area. Preparation of the land begins immediately after the harvest of second-crop paddy in January and repeated ploughings are given with the receipt of every summer shower thereafter. The soil is thus brought into a fine tilth before the seeds are sown in April–May, following a soaking rain. This practice precludes raising of a green manure crop on the lands. Other bulky organic manures are also not applied usually, for fear of wash of the added manurial ingredients in the torrential rains of the South-West monsoon. The good tilth that is produced by bringing the soil into a fine state of division by a scrupulous attention to preparatory cultivation, brings in a normal yield, provided the distribution of pre-monsoon showers remains normal. Increased yields are also obtained by top dressing with ammonium sulphate; this practice having come into vogue in recent times.

It will thus be seen that the broadcast crop of autumn rice in Malabar goes without an adequate basal dressing while all the organic manures available in a farmstead are applied to the fields in the second-crop season. A trial was therefore undertaken to find out how far heavy doses of organic matter like green leaf and cattle-manure applied to the second crop would, by way of residual effect, influence the yield of the succeeding broadcast crop in the same fields.

The results of trials carried out at the Agricultural Research Station, Pattambi are outlined in this paper.

Previous work done at the Station: The results of a number of manurial experiments conducted at the station showed that green leaf up to 8,000 lb. did not have any residual effect on the succeeding transplanted crop. In its direct effect green leaf at 5,000 lb. was found to be on a par with cattle manure at 10 tons per acre.

Experimental: The experiment was laid out in split-plot design. Green leaf at 5,000 lb. per acre, cattle manure at 10 tons per acre and 'No manure' were the treatments in the second crop season. For the following broadcast crop, each plot was split for the two

treatments 'Manure' and 'No manure'. The manure consisted of green leaf at 2,000 lb. superphosphate at 150 lb. and ammonium sulphate at 150. lb. per acre. For the transplanted second crop, green leaf and cattle manure were applied a fortnight before planting and for the following broadcast crop, green leaf and superphosphate were applied five days before sowing and ammonium sulphate, two months after sowing. Strain PTB 20 was used for transplanted second crop and strain PTB 2 for the broadcast first crop in all the three seasons. The experiment was commenced in the second-crop season 1950 and concluded in the first-crop season 1953.

The yield data are presented in tables I, II, and III.

It will be seen from the results that in the second crop season cattle manure at 10 tons gave 25·4 per cent increased yield over 'No manure' while green leaf at 5,000 lb. per acre recorded 4·3 per cent increase over that recorded by cattle manure (Table I).

In the first crop season for broadcast crop, an increased yield of 11.2 per cent was recorded by cattle manure as sub-plot treatments (Table II.)

From the figures in table III, it will be seen that cattle manure recorded 22.4 per cent increase by way of residual effect.

Discussion: The results confirm the previous finding that for direct effect a greater bulk of cattle manure than usual is necessary for swamp rice to equal the effect of green leaf at 5,000 lb. per acre and that green leaf had little or no residual effect. The extra cost involved in a heavy application of cattle manure is more than compensated by the remarkable residual effect on the following broadcast crop, resulting in an increased yield of over 20 per cent.

It may be mentioned in this connection that basal manuring of broadcast crop of rice in Malabar has always remained a problem for the cultivator. Previous trials have shown that green leaf could be applied to the soil in the dry state. In the foregoing experiment also, direct manuring of broadcast crop has resulted in an increased yield of about 30 per cent.

But what is found feasible in the case of experimental plots may not lend itself to extensive practice, since green leaves in sufficient quantities become available only after the profuse flush of trees and shrubs during the South-West monsoon period. It is also not

likely that the ryots would give up the practice of broadcasting. More than the non-availability of labour and the resources of the farmers, it is the long-range object of conservation of soil that appears to lie behind this age-long practice. It is a fact that puddling operations carried out during periods of heavy and continuous rainfall result in considerable loss of the fine fractions of soil and organic matter. Transplanting in the first-crop season is therefore confined to low-lying areas where broadcasting will not be possible since one or two showers would be enough to make the soil over-moist, making it impossible to bring it into a friable state. The most appropriate practice would be to manure the transplanted second crop heavily with green leaf and cattle manure for direct and residual effects respectively.

As mentioned already, the cultivators do apply their cattle manure to the second crop, but the quantity available for application is usually too little to be of any residual value. It is here that rural compost looms in importance and its preparation in any quantity would surely benefit the farmer on the West Coast.

Summary: The results of an experiment to find out how far heavy application of organic manures to transplanted crop of rice in the second crop season would influence by residual effect the yield of the following broadcast crop, are presented.

As far as direct effect on swamp rice is concerned it is found that 10 tons of cattle manure have to be applied to equal the effect of 5,000 lb. green leaf, giving an increased yield of about 30 per cent.

Such heavy application of cattle manure leaves a very pronounced residual effect, increasing the yield of the subsequent broadcast crop by about 21 per cent.

The benefit of such heavy applications of cattle manure or compost is explained.

Acknowledgments: Our thanks are due to successive Paddy Specialists at Coimbatore under whose guidance the experiments were conducted.

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TABLE I

Pre-season manuring trials

Treatments:

Second crop season.

1. Green leaf at 6,000 lb. per acre.
2. Cattle manure at 10 tons per acre.
3. No manure.

First crop season.

1. Manure: Green leaf at 2,000 lb. superphosphate to supply 30 lb. P_2O_5 — Ammonium sulphate at 150 lb. per acre.
2. No manure.

Layout: 3 × 4 split-plot design.
Plot size: 36·5′ × 32·5′.

Combined analysis of the Three Second-Crop Seasons' Results

Particulars	Green leaf	Cattle manure	No manure	G. M.	S. E.	'Z' test	C. D. (P=0·05)
Acre yield in lb.	2003	1936	1544	1828	29·98	Satisfied	61
% on control	129·7	125·4	100·0	118·3	1·94		3 93

TABLE II

Combined analysis of the Three First-Crop Seasons' Results

Particulars	Green leaf	Cattle manure	No manure	G. M.	S. E.	'Z' test	C. D. P : 05
Acre yield in lb.	1749	1885	1695	1776	69·2	Satisfied	138
% on control	103·2	111·2	100·0	104·8	4·08		8·16

TABLE III

For Interactions

Particulars	Manure			No manure			G. M.	S. E.	'Z' test	C. D. P : 0·05
	Green manure	Cattle manure	No manure	Green manure	Cattle manure	No manure				
Acre yield in lb.	2057	2114	2038	1441	1655	1353	1776	98·04	Satisfied	196
% on control	152·0	156·3	150·7	106·5	122·4	100	131·3	7·24		14·48

Rhizome Rot and Wilt of Ginger and their Control

by
N. V. SUNDARAM, B. Sc., (Ag.), M. Sc.,
Assistant in Mycology

Ginger is cultivated on a large scale in Malabar and Godavari districts, the area under this crop being over 12,250 acres. In recent years the price of ginger has risen to such a degree that this crop has assumed great importance. Several diseases affect this crop but the most serious one is the wilt and the rhizome rot caused by more than one species of *Pythium* and *Sclerotium rolfsii* Sacc. The disease affects the harvested rhizomes stored for seed purposes as well as plants in the field. A storage rot occurs in the former and the wilting of the shoots followed by rotting of connected rhizomes is prevalent under field conditions. This disease has been under study by various investigators in many countries (Parham 1935, McRae 1911, Sen 1930, Uppal 1940). Four species of Pythium viz. *P. aphanidermatum*, *P. myriotylum*, *P. vexans* and *P. graminicolum* have been found to be capable of causing infection.

Pretreatment of rhizomes with chemicals in order to control the disease was first recommended by Park (1934, 1935, 1937_a, 1937_b) in Ceylon. He found that immersion of seed ginger in 0·1% mercuric chloride solution for two hours either just after harvesting or just before sowing yielded many more plants than untreated seed. Since then these have been tried in other States also. Elaborate experiments were laid out in Malabar during 1938 and succeeding years to find out the effect of various treatments on the incidence and control of storage rot and wilt.

Treatment of rhizomes with Ceresan, Agrosan GN. or mercuric chloride was found effective in preventing storage rot. Treatment of the rhizomes before storage was more useful than treatment at planting time. In some experiments mercuric chloride exerted a depressing effect on the yield of rhizomes, especially when the treatment was carried out twice, once before storage and again before planting. Application of Bordeaux mixture to the soil did not control the disease or affect the yield to any extent (Thomas, 1938, 39, 40, 41, 42, 43, 44).

In 1950 a scheme for the improvement of ginger was sanctioned by the Indian Council of Agricultural Research and was initiated at the Agricultural Research Station, Pattambi. Some of the

experiments included in the programme related to the study of the diseases. The results of the investigation carried out in 1950—'51 on the yield of ginger are recorded in this paper.

Materials and Methods: Seed rhizomes were purchased from ryots for use in these experiments. Many of them were badly affected by *Sclerotium rolfsii.* Apparently healthy rhizomes were selected from among these for the various treatments. In one experiment the soil was treated before planting by pouring a quarter pint of 1% Bordeaux mixture, 0·25% Perenox solution, Cheshunt compound, Colloidal copper or 0·05% of Mercuric chloride solution per planting pit. The treatments were carried out in replicated randomised plots. Storage trails were also conducted to test the effect of immersing the rhizomes in different strengths of Ceresan (wettable) and mercuric chloride solutions for varying periods. Two brands of mercuric chloride were used viz., tablets prepared by May & Baker for agricultural use and the chemical purchased from chemists. The rhizomes were selected, immersed in solutions and dried under shade before pitting.

Results: *Effect of soil treatment:* The experimental plots were periodically examined to find out the germination percentage and the incidence of diseased shoots. It was found that the highest germination was in the plots treated with collodial copper and Cheshunt compound. Bordeaux mixture and mercuric chloride application to the soil inhibited germination. The disease was prevalent in all the plots but the highest incidence was in the control where 16% of the shoots were found wilting. The weights of the rhizomes from each treatment were recorded at the time of harvest. The following table gives the results.

TABLE I

Treatments	Germination percentage	Average No. of tillers	% of diseased shoots in the field	Total yield of rhizomes from 5 beds
1% Bordeaux mixture	22 6	9·55	6·6	7·25 lb.
0·25% Peronox	66·0	8·05	11·9	26·50
Colloidal copper	76·6	8·61	10·9	35 25
Cheshunt compound	74·6	8·78	10·5	34·50
0·05% Mercuric chloride	44·0	8·07	5·7	20·76
Control (no treatment)	61·3	8·49	16·0	29·25

The highest yield was recorded from the plots treated with Cheshunt compound and colloidal coppor and the lowest from the plots treated with Bordeaux mixture. There was not much difference

between the treatments in the production of tillers per plant. There is an indication in these experiments that drenching the soil with Cheshunt compound or colloidal copper will be useful in increasing the yield. Bordeaux mixture or mercuric chloride solutions cannot be recommended for soil treatment.

Storage experiments: Equal quantities of selected, apparently healthy, rhizomes were treated with different strengths of mercuric chloride (powder and May & Baker tablets) and wettable Ceresan before storage. The rhizomes were immersed in the solutions for varying periods and were stored only after drying in the shade. A long pit 3 feet deep wide at the bottom and 1 foot wide at the top was prepared and divided into 36 compartments for holding rhizomes which were given different treatments.

A plank was kept over the rhizomes which occupied about half the depth of the pit and covered over with earth, making arrangements for ventilation. The pits were filled in December 1950 and the rhizomes taken out and examined in May 1951. The relative quantities of the healthy and the diseased rhizomes are given in the following table.

TABLE II

Treatments	Time of immersion	Quantity stored in pounds	Healthy rhizomes in pounds	Diseased rhizomes in pounds	% of healthy rhizomes
0·1% mercuric chloride (powder)	1½ hrs.	80	60	20	75
0·2% ,,	45 min.	,,	57	23	71
0·4% ,,	20 min.	,,	59	21	74
0·05% Mercuric chloride (M & B) tablets	1½ hrs.	,,	60	20	75
0·1% ,,	45 min.	,,	63	17	79
0·2% ,,	20 min.	,,	54	27	68
0·25% Ceresan (wettable)	30 min.	,,	65	15	81
0·5% ,,	15 min.	,,	59	21	74
Control (no treatment)	..	,,	44	39	55

It is seen from the above table that the treatments have been helpful in reducing the incidence of disease during storage. There was a higher proportion of healthy rhizomes in the treated lots than in the control. This confirms the previous finding that seed treatment with mercuric chloride or Ceresan is useful for preventing storage rot. There was no difference between the May & Baker tablets and ordinary mercuric chloride, but the former is easier to handle.

It must however be stated that the above results represent the first year's observations only. The results during the subsequent years were also in conformity with the first year results.

Acknowledgment: I am thankful to the Government Mycologist for affording all facilities in carrying out the experiments. My thanks are also due to the Superintendent, Agricultural Research Station, Pattambi for rendering help in carrying out the field experiments.

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Errata

(M. A. J. November 1955)

	For	Read
Page 501. Para 5:	and Rs. 3—8—0 for dressed grades	and Rs. 8—3—0 for dressed grades
Page 504. Tabular Statement. Headings second column:	Indian True Hemp	Italian True Hemp

Addenda et Corrizenda

In the article entitled "The intake of silica by the rice plant, with reference to Blast Disease" by Sri S. Venkatachalam, published in the Madras Agricultural Journal of September 1954, the following acknowledgment is added :

"The author is grateful to the Madras University for awarding a studentship in 1945–'45 for pursuing this investigation."

* * *

The article entitled "The Soils of the Lower Bhavani Project area and means of improving their fertility" published in the Madras Agricultural Journal of November 1955, was contributed by the following :

Sri T. Rajagopala Ayyangar, Sri P. Kunhi Raman Menon and Sri M. P. Sankaranarayanan.

A note on *Smithia bigemina* Dalz—a useful green manure crop

Smithia bigemina Dalz., belongs to the natural order *Leguminosae* and occurs wild in the Anamalais at elevations ranging from 3000 to 4000 feet. It is found to grow mostly over sheet rocks in the midst of swamps in semi-shady as well as open locations. It is also seen to occur occasionally in semi-shady situations along the edges of sholas or in partially open patches in the sholas. The growth in these locations however is found to be less luxuriant than in swamps. A brief description of the plant is given below.

It is an annual, diffuse, 6–12" high, stems and branches very slender, bristly with yellowish hairs.

Leaves abruptly pinnate; rachis 1/8" long, hairy and bristle pointed; petioles very short; stipules scarious, lanceolate, cuspidate, prolonged below their insertion into acuminate or lacerate auricles. Leaflets two pairs, subsessile, 1/8–7/16 by 3/16–18" oblanceolate, cuneate, obtuse and bristle-pointed at the apex, glabrous above, more or less strigose beneath, ciliate.

Flowers 2–8, in copious axillary racemes, crowded towards the tops of the peduncles; peduncles, glabrous longer than the leaves; pedicels very short, hairy, bracts beneath the raceme thinly membranous, oblong, bristle-pointed, glabrous, bracteoles beneath the calyx scarious, ovate lanceolate, bristle-pointed and bristly along the middle rib at the back, half as long as the calyx. Calyx 1/8" long, membranous, with dichotomously branched veins; lips equal, bristly outside, strongly bristled, ciliate on the margins, the upper lip truncate or slightly emarginate, the lower acutely 3-toothed, the middle tooth being the longest. Corolla yellow, twice as long as the calyx. Pods, 6–8 jointed, joints tubercled".

The plant grows very rapidly. It throws out a large number of branches which straggle along the ground and form a thick carpet thereon. The branches produce few or no roots. A fully grown-plant covers an area of about one squre foot. The root system is very fibrous and spreads about sixteen inches. The tap root goes to a depth of about six inches. The roots contain innumerable bacterial nodules.

It flowers during October–November and seeds during December–January. The seeds are minute and difficult to collect. They take 4 to 8 days to germinate. With dry weather the plant gradually dries up leaving a frail cover over the soil. With the onset of rains self-sown seeds germinate in large numbers.

The plant adds a good deal of mulch to the soil and is besides helpful in keeping down growth of weeds, particularly of grass. It has the special advantage that the spreading branches produce few or no roots and therefore it is not likely to compete with the main crop. Further it is tolerant of a certain amount of shade. In view of these features it appears to be suitable for cultivation in young plantations were soil erosion is likely to be considerable. Trials are being carried out to grow it as a cover crop in young Cinchona areas. The first year's trials have been only partially successful. The second year's trials are under way.

The crop is worth a trial in other moist and high elevation localities also.

Acknowledgement: The Government Systematic Botanist and Professor of Botany, Agricultural College, Coimbatore was kind enough to furnish a description of the plant. This crop has been under study by the Propagation Wing of the Govt. Cinchona Plantations, Anamalais, since June 1953. The author wishes to acknowledge these facts with gratitude.

S. KALAYANASUNDARAM, B. Sc.,
Propagation Assistant, Cinchona P. O.

Notes and News

We are glad to announce that Sri R. Ramakrishna Naidu of Perianaickenpalayam has become a Patron of the Madras Agricultural Students' Union.

Sri Naidu is an enlightened landlord owning extensive areas both under dry and garden cultivation. A part of the lands where the present Sri Ramakrishna Mission Vidyalaya is situated was donated by him in the cause of education. Though basically a farmer, he devotes considerable time to public activities as well. He was an M. L. C. in the last term of the Madras Legislature. During the lifetime of Sri T. A. Ramalingam Chettiar, he was the Vice-President of the Co-operative Central Bank at Coimbatore and succeeded Sri Chettiar as its President for about six years. Lately he has also become a mill magnate and is the Managing Director of the Palamalai Ranganathar Mills at Perianaickenpalayam. He is a regular visitor to the Agricultural College Day and Conference.

We wish that more and more among the land-holders in our State emulate the example of Sri Naidu and become our patrons and thereby encourage us to be of service to agricultural development in Madras.

* * *

An elocution contest was held on 1—12—1955 at Freeman Hall with Sri U. Narasinga Rao as President and Chief Judge. The subject for the contest was "The role of Agricultural Graduates in the Food Problem of Madras". Sri R. Krishnamurthy and Sri U. Sriramulu were selected as the best speakers of the day.

Under the Social Service League of the Students' Club donations were collected for the Tanjore Flood Relief Fund. About Rs. 1000/- and 600 clothes were collected by the students. The Second Year Students went on an educational tour from 3rd December onwards and returned on 17th December 1955. They visited Erode, Kalluppatti, Aduthurai, Dindigul, Madurai, Koilpatti and Tenkasi, and acquainted themselves with the agricultural practices that are in vogue in these areas.

Inauguration of the Village Seed Farm, Seed Exchange for ADT 3 and ADT 20 by the Director of Agriculture, Madras, Sri P. P. I. Vaidyanathan, I. C. S. at Veppathur Village, Kumbakonam, 18th November 1955.

Gleanings

Hybrid Vigour Effects with Cotton: B. G. Christidis. (Journal of Genetics, 53, P. 224—231.) Work carried out in Greece from 1948 to 1953 with a number of cotton varieties indicates that hybrid vigour effects are generally unmistakable. Appreciable yield increases have been obtained with F_1 seed, particularly when the mean of all F_1 hybrids is compared to the parental mean. In comparisons between individual F_1s and their best parent, the advantage proves far less pronounced. Combining ability differs considerably, according to varieties and seasons. Values for ginning outturn and lint length are generally lower in the F_1 hybrids than in the best parent; however, the few data available for bulk weight suggest an appreciable increase with F_1 seed. In the F_2 generation significant heterotic effects have never been established in favour of the hybrid seed, while the F_3 proved definitely unsatisfactory. Yield increases obtained with F_1 seed over the best parent are comparatively small. Hence, in view of the difficulties involved at present in producing hybrid cotton, its use for practical purposes seems to be of limited importance. [T. R. N.]

The Use of Penicillin Wastes as a Fertiliser: L. B. Thrower. (Journal of Agricultural Research. May 1955. p. 432.) Waste mycelium from penicillin production is useful as a fertilizer, but its effect is largely that of other organic materials. *Penicillium chrysogenum* Thom; does not establish itself in the soil and its beneficial influence on soil structure is due to its utilisation as a substrate by rapidly growing Mucorales. Residual, crude penicillin contained in the mycelium may have an effect on the soil bacteria, but it was not effective as a systemic fungicide in water culture experiments. Any influence due to residual penicillin would be of short duration because the antibiotic is unstable at normal temperatures; autolysis of the mycelium is evident after about 24 hours. The mycelial extract has an adverse effect on the germination and growth of tomato seeds, indicating that it contained a plant-growth-substance such as indole-acetic acid. [T. R. N.]

Control of Erosion: The effectiveness of erosion control depends greatly on the establishment and maintenance of suitable vegetation to bind and protect the soil and improve its structure. Rhodes grass (*Chloris gayana* Kunth), first made popular in South Africa by Cecil Rhodes, has been widely used to counter erosion successfully in the northern part of New South Wales. This grass is a tufted, perennial species, with roots that may extend ten to 12 ft. below the surface in deep, loamy soils. It grows fairly in summer, and is thus very suitable for regions with hot, humid, wet summers and mild winters, and an annual rainfall between 22 and 50 inches.

The ability of Rhodes grass to withstand drought is remarkable. At Scone Research Station, New South Wales, during dry periods in summer or autumn it has remained green and actually grown fresh leaf up to six weeks after other traditionally drought-tolerant grasses ceased growing. As a perennial, drought-tolerant, summer-growing species Rhodes grass affords excellent soil protection throughout the year, and especially when storms of great intensity are experienced.

Once established, stolons cover the soil effectively and rapidly stabilise earthworks, waterways and eroded soils, thus minimising the loss of soil and run-off. It will withstand heavy grazing if the stock are removed at certain periods, and will regenerate the structure of soils which have lost their top layers or have been depleted by overcropping. It grows well with legumes to provide nutritious forage, and is responsive to applications of nitrogenous fertilisers.

Rugs don't Raise Milk Yield: *Does covering cows with rugs make them give more milk?* Experiments conducted by Government agricultural stations in New South Wales, show that rugged cows produce no more milk than when they are unrugged. The only difference noted by animal nutrition researchers was that cows without rugs usually had rougher coats than those that were rugged. No changes in health or body conditions were observed. It is possible, however states an officer of the Veterinary Research Station at Glenfield, New South Wales, that under certain conditions, when cows are underfed or the weather is very cold or where there is little shelter from the wind, rugging may be beneficial.

Record Wool Clip: Production of wool for July 1954–June 1955 in Australia was the highest on record. At 1,288 million lb. it was 6·9 million lb. more than the record for 1952–53. The quantity of wool sold, 3,9,55,476 bales, was also the highest on record, and its value was £ A 352·6 million. Crossbred wools were well supported, and their fall in price compared with the previous season was not so great as that of merino wool. Great Britain continued to be Australia's best customer for greasy wool. British purchases at 296 9 million lb. were more than ten million lb. higher than in the previous season.

Japanese purchases registered a big increase from 95 million lb. to 124·7 millions, but Italian purchases dropped from 144 millions to 89 millions. Other big customers were: France 159 million lb.; Belgium 90 million lb.; German Federal Republic 64·5 million lb.; the United States 58·6 million lb. Sales of greasy and scoured wool in each State in bales was: New South Wales 1,380,628; Victoria 1,112,039; Queensland 588,207; South Australia 455,116; Western Australia 347,774; Tasmania 71,712. The number of sheep in Australia on March 31,1955 was provisionally estimated at 129,26 million, the highest ever recorded and 2.4 per cent more than in 1954.

The State-wise distribution of sheep, in thousands, was:

New South Wales	58,800
Victoria	20,116
Queensland	19,905
Western Australia	13,474
South Australia	12,817
Tasmania	2,586
Australian Commonwealth Territory	238
Northern Territory	29

[Australian News letter]

Manuring Onions in Right Doses: (New Delhi): The onion crop requires a liberal supply of organic manures to yield well. The manure should be applied to the soil well in advance of transplanting. Farmyard manure or green manure should be freely applied to maintain a good physical condition of the soil. Well-rotted farmyard manure should be applied at 10 to 20 tons per acre after the first ploughing so that it may be well-mixed with the soil during the subsequent cultivation. The manure can also be applied to the previous crop. Application of commercial fertilizers, particularly those containing nitrogen proves beneficial, especially when farmyard manure has been applied in smaller quantities. Application of six maunds of ammonium sulphate, half at the time of transplanting and the other half one month later, gives good results. Overdoses of artificial fertilizers, however, are to be avoided. They affect the keeping quality of the bulbs, and cause a greater percentage of 'bull necks' in the crop.

[ICAR, New Delhi].

Weather Review — For November, 1955

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January	Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenam-bakkam)	8·0	— 6·0	46·9	South	Madurai	6·5	— 0·8	36·7
	Tirur-kuppam*	5·2	— 2·7	45 3		Pamban	9·0	— 2·7	28·3
	Vellore	2·7	— 5·0	33·0		Koilpatti*	5·0	— 0·3	20·4
	Gudiyatham*	0·9	— 2·4	32·9		Palayam-cottai	11·0	+ 3·6	26·6
						Amba-samudram*	12·8	+ 3·7	32·2
East Coast	Palur*	3·5	— 4·9	45·2	West Coast	Trivandrum	12·8	+ 0·7	77·9
	Tindivanam*	3·2	— 2·4	37·0		Fort Cochin	10·2	+ 3·5	147·4
	Cuddalore	3·7	- 11·8	42·6		Pattambi*	4·6	+ 0·8	99·7
	Naga-pattinam	9·9	— 7·6	44·9		Kozhikode	6·1	— 1·3	156·9
	Aduthurai*	4·2	— 3·9	39·3		Taliparamba*	0·9	— 2·1	137·5
	Pattukottai*	4·7	— 2·8	33·0		Wynaad*	2·5	— 1·1	77·3
						Nileshwar*	2·3	— 0·1	177·5
						Pilicode*	1·9	— 0·9	151·4
Central	Salem	2·2	— 1·6	35·8		Mangalore	1·7	— 2·2	150·3
	Coimbatore (A. M. O.)*	2·2	— 0·8	17·1		Kankanady*	1·9	+ 0·1	151·3
	Coimbatore	1·0	— 3·0	18·4	Hills	Kodaikanal	7·7	— 2·5	73·4
	Tiruchira-palli	2·6	— 4·4	38·5		Coonoor*	5·9	— 6·2	46·2
						Ootacamund*	2·7	— 1·6	65·2
						Nanjanad*	2·4	— 0·9	59·2

Note:— * Meteorological Stations of the Madras Agric. Dept.

The month began with fairly widespread thundershowers in Tamilnad, particularly n Coastal regions. This sort of weather continued for three days with no appreciable change. On 4—11—1955 a depression was noticed in the South-East Bay of Bengal, about 200 miles South-west of Port Blair. It was active for three days and then became weak on 7—11—1955. Subsequently the weather was dry throughout the State till 12—11—1955. On 13—11—1955 scattered showers were received at a few places in Tamilnad. There was no large change in weather conditions in the next two days.

The weather was practically dry on 16—11—1955 and on the next day as well. On 18—11—1955 conditions became favourable for a revival of the North-East monsoon rains. In the next two days localised showers were received in Tamilnad and in the districts of Malabar and South Kanara. A shallow depression was noticed in the Bay of Bengal on 21—11—1955, about 350 miles east of Nagapattinam. This shallow depression was centred on the next day about 250 miles east-south-east of Madras. Due to its presence scattered showers were received in Tamilnad. This depression got filled up on 23—11—1955 with the result that thundershowers were fairly widespread in coastal Andhradesa and Rayalaseema and scattered in Tamilnad and Mysore. Two days later, fairly widespread showers were received in Tamilnad. For three days from 26—11—1955 practically dry weather existed, barring a few, highly localised, light showers at a few places in the South and coastal regions of Tamilnad. On 29—11—1955 a depression was observed in the Bay of Bengal about 150 miles east of Nagapattinam by about 20 miles. The month ended with fairly widespread, moderate showers in the entire Madras State.

An earthquake shock of moderate intensity, about 4850 miles away from Madras was recorded by seismograph in the Meteorological Office, Madras at 12·11 hours IST on Wednesday 23—11—1955.

Considering the month of November 1955 as a whole, practically the entire Madras State received only sub-normal rains, barring a few localities in the West Cost and in Tirunelveli district.

The noteworthy rainfalls and the zonal rainfall in inches are furnished below:—

Noteworthy Rainfalls			Zonal Rainfall			
Date	Place	Rainfall in inches	Name of Zone	Rainfall for the month	Departure from normal	Remarks
3/11/55	Nagapattinam	2·0	North	4·2	— 4·0	Below normal
5/11/55 and 30/11/55	Madras (Nungambakkam)—each day	2·0	East Coast	4·9	— 5·6	Far below normal
16/11/55 and 30/11/55	Alleppey—each day	2·0	Central	2·0	— 2·5	do.
21/11/55	Fort Cochin	3·0	South	8·9	+ 0·7	Just above normal
25/11/55	Pamban	4·0				
,,	Tuticorin	4·0	West Coast	4·0	— 0·3	Just below normal
,,	Trivandrum	4·0				
,,	Palayamcottai	3·0				
29/10/55	Kodaikanal	2·0	Hills	4·7	— 2·8	Below normal

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 13—12—1955.

C. B. M. & M. V. J.

Departmental Notifications

Gazetted Service—Postings and Transfers

Name and present post	Posted as
Bhavani Shanker Rao, M., Millets and Pulses Specialist, Coimbatore.	Paddy Specialist, Coimbatore.
Ponnaya, B. W. X., Asst. Millet Specialist.	Millet and Pulses Specialist, Coimbatore.
Ramaswami, V., Asst. Cotton Specialist, Srivilliputhur.	Asst. Cotton Specialist, Coimbatore.
Ranganathachari, N. Addl. D. A. O., Madurai.	Asst. Lect. in Economics, Coimbatore.
Ramaswami, K., Paddy Specialist, Coimbatore.	Rice Specialist, Gambia, West Africa.
Ramachandran, S. V., Asst. Marketing Officer,	D. A. O., Trichy.
Ramachandran, C. K., Asst. Cotton Specialist, Koilpatty.	Cotton Extension Officer, Coimbatore.
Santhanam, V., Asst. Cotton Specialist, Coimbatore.	Asst. Cotton Specialist, Srivilliputhur.
Subramania Iyer, K. H., D. A. O., Trichy.	Asst. Marketing Officer, Coimbatore.

Upper Subordinates

Name and present post	Posted as
Achuthan, V., A. D. Tirur, Malabar Dt.	Extension Officer, Tellicherry Block.
Abdul Latheef, M., A. D., Reddiapatty.	Extension Officer, Singampuneri Block.
Appadurai R., Millets Asst., Koilpatty.	Librarian, Agrl. College, Coimbatore.
Balasubramaniam, M., A. D., Peruvalapur.	Asst., in Plant Physiology, Coimbatore.
Balasubramaniam, R., S. D. A., Tanjore.	P. P. A., Tanjore.
Dorairaj, K., Paddy Asst., Tirur.	Paddy Asst., Aduthurai.
Gopalakrishnan, B., A. D., Dharapuram.	Extension Officer, Kundadam Block.
Ganapathy, D., A. D., Lalgudi.	Extension Officer, Vellianai Block.
Gopalakrishnan, R., A. D., Vegetables, Madras.	A. D. Kanjeepuram.
George, A., A. D., Mannargudi.	A. D., Kumbakonam.
Jagannathan, K., Spl. A. D., Cotton, Coimbatore.	Research Asst., Kallar and Burliar.
Krishnaswami Sarma, M. C., F. M., Bhavanisagar.	A. D., Natham, N. Madurai.
Krishnan, S., A. D., Natham.	A. D., Ambasamudram,
Kutti Mudali, K. S., A. D., Coimbatore.	P. A. to D. A. O., Coimbatore.
Kumari Kunjamma, V. K., Librarian, Coimbatore.	Asst., in Millets, Coimbatore.
Muhammad Ghouse, I., A. D., Theni.	Paddy Asst., Palur.
Mahaboob Ali Khan, A. D., Trichy.	Extension Officer for Agrl., Valathi Block.
Narasimha Pattathan, B., A. D., Kasargode.	Extension Officer, Nileshwar Block.
Nanjappa Maniagar, Y., A. D., Dharmapuri.	Extension Officer, Kaveripatanam Block,
Padmanabha Menon, E., A. D., Manantody.	A. D., Tirur, S. Malabar.
Ranganatha Prabhu, K., Coconut Nursery Asst., Nileshwar.	Pepper Development asst , Rajapuram.
Ramakrishna Pillai, C., Tinnevelly.	A. D., Kilayanur.
Ramaswami, A. N., Asst. in Plant Physiology, Coimbatore.	Asst. in Chemistry, Coimbatore.
Sankaranarayanan, R., Paddy Asst., Palur.	Paddy Asst., Tirur.
Subramaniam, V., A. D., Nangunneri.	Instructor in Agrl. Basic Agrl. Training School, Koilpatty.
Sivaraman, S. S., P. P. A., Tanjore.	Spl. A. D., Dt. Co-operative Cotton Marketing Society, Aduthurai.
Shanmuga Sundaram, R., A. D., Kumbakonam.	A. D., Mannargudi.
Sundaram, K., A. D., Udumalpet.	A. D., Coimbatore.
Shanmugam, C., A. D., Gudiyattam.	Extension Officer in Agrl. Kilavaithinankuppam.
Thirunavakarasu, R., A. D., Paramathi.	Extension Officer in Agrl., Perambalur.
Venkataswami, B., Extension Officer, Krishnagiri.	A. D., Cuddalore.
Venkataramana Rao, V. G., D. A. O., Tanjore.	A. D. Vegetable, Madras.
Venkatarangam, R., O. S. Dev. Asst., Cuddalore.	Spl. A. D. Cotton, Coimbatore.
Vilvanathan, N.	Entomology Asst., Coimbatore.

DISTRICTS
S. ARCOT; COIMBATORE
MALABAR, S KANARA
RAMANATHAPURAM
TIRUNELVELI
NORTH ARCOT

MARKET COMMITTEES CHRONICLE
A FACTUAL RECORD OF SERVICE FOR REGULATED MARKETING

CROPS
COTTON, GINGELLY
GROUNDNUT
COCONUT
ARECANUT
TOBACCO

Review of Market Conditions of Commercial Crops in the Areas of Market Committees for November, 1955

1. **Cotton:** (In this section: Candy = 784 lb; Pothi = 280 lb.)

Cotton Stocks: Tirupur: Lint: The cotton market at Tirupur opened with a stock of 6,266 candies of Cambodia and 3,532 candies of Karunganni. Arrivals during the month amounted to 2,984 candies of Cambodia and 934 candies of Karunganni which included 755 cdys. of Combodia and 23 cdys. of Karunganni got by way of ginnings, as against the arrivals of 4,934 cdys. of Cambodia and 2,166 cdys. of Karunganni in all during the previous month. Despatches from Tiruppur accounted for 4,744 cdys. of Cambodia and 1,695 cdys. of Karunganni which included 1,849 cdys. sent to Travancore-Cochin, Bombay, Orissa States and North Arcot, Madura and Tirunelveli districts within the State. The Market closed with a stock 4,416 cdys. of Cambodia and 2,771 cdys, of Karunganni at the end of the month.

Kapas: The kapas market at Tirupur started with an opening balance of 7,230 pothis of Cambodia and 1,313 pothis of Karunganni kapas at the beginning of the month. Arrivals in the month amounted to 11,965 pothis of Cambodia and 202 pothis of Karunganni as against 12,672 pothis of Cambodia and 142 pothis of Karunganni during the previous month. Disposals during the month were 11,425 cdys. of Cambodia and 512 pothis of Karunganni leaving a stock of 7,770 pothis of Combodia and 1,003 pothis of Karunganni at the close of the month.

Koilpatti: Lint: The market at Kolipatti started with an opening balance of 633 cdys. of Karunganni and 450 cdys of Uganda

lint during the month. Arrivals in the month amounted to 800 cdys. of Karunganni and 300 cdys. of Uganda. Disposals accounted for 1,050 cdys. of Karunganni and 300 cdys. of Uganda by way of consumption by mills. There remained a closing stock of 383 cdys. of Karunganni and 450 cdys of Uganda at the end of the month.

Kapas: There was no stock of Karunganni kapas during the month. Arrivals in the month amounted to 500 pothis of Uganda as against the arrivals of 1,000 pothis during the previous month. The arrivals were entirely ginned and there were no stock at the close of month.

Good demand has been registered during the month from the mills for quality cotton as only low stocks are reported to be available in the market.

Ramanathapuram District: Lint; The three markets of Virudhunagar, Sathur and Rajapalayam put together opened with a stock of 1,095 cdys. comprised of 345 cdys of Karunganni and 750 cdys. of Uganda. Receipts in the month amounted to 2,075 cdys. which included 5,050 cdys. of Karunganni, 1,140 cdys. of Uganda and 430 cdys. of Cambodia as against the total arrivals of 3,565 cdys. during the last month. Disposals during the month were 2,075 cdys. comprising 710 cdys. of Karunganni, 970 cdys. of Uganda and 390 cdys. of Cambodia. The markets closed with a stock of 1,100 cdys. in all (140 cdys. of Karunganni, 920 cdys. of Uganda and 40 cdys. of Cambodia) at the end of the month.

Kapas: The kapas market in the above three markets opened with a stock of 3,450 pothis (100 pothis of Karunganni, 3,000 pothis of Uganda and 350 pothis of Cambodia) at the commencement of the month. The arrivals during the month amounted to 5,475 pothis (1,575 pothis of Karunganni, 2,300 pothis of Uganda and 1,600 pothis of Cambodia) as against 9,800 pothis in all during the previous month. Disposals during the month were 6,875 pothis (1,675 pothis of Karunganni, 3300 pothis of Uganda and 1,900 pothis of Cambodia) leaving a closing stock of 2,050 pothis at the end of the month which included 2,000 pothis of Uganda and 50 pothis of Cambodia.

The kapas market in all the markets of this district was, in general, brisk.

South Arcot District: Kapas: All the markets of South Arcot district opened with a stock of 253 pothis at the commencement of the month. Receipts in the month amounted to 2,743

pothis as against 3,339 pothis during the previous month. The receipts during the month were only in Villupuram and Panruti markets. Despatches accounted for 2,694 pothis in the month which are wholly confined to Tirupur in Coimbatore district. There was a closing stock of 302 pothis at the end of the month with the trade.

Cotton Prices: Lint: Tirupur: Even though the transactions in lint were mostly confined to second and third qualities, the prices of both cotton lint and kapas were firm during the month. The second quality lint was sold at 840/-and the lint of Co. 4 cotton at Rs. 1,040/- per cdy. The price of second quality Karunganni lint was sold at Rs. 727/- per candy.

Koilpatti: Price of cotton lint at Koilpatti was more or less steady around Rs. 700/- to Rs. 720/- till the third week of the month and advanced by Rs. 26/- during the last week of the month consequent to the demand from the mills caused as a result of shrinkage in stocks. Transactions for the first quality, second quality and inferior varieties were placed at Rs. 700/- to Rs. 746/-, Rs. 650/- to Rs. 700/- and Rs. 540/- to Rs. 560/- per cdy. respectively. Prices of Uganda lint were steady at Rs. 1.120/- for certified quality and Rs. 970/- to Rs. 1,000/- for the uncertified quality.

Ramanathapuram District: The Karunganni lint price in all the markets opened at the following rates:

Rs. 686 to 700 for I crop (per cdy.)
Rs. 630 to 650 ,, II ,, ,,
Rs. 580 to 626 ,, Tinny Karunganni mixture (per cdy.)
Rs. 470 to 530 ,, Tinny

The prices gradually increased and stood steady as follows:

Rs. 696 to 741 for I crop (per cdy.)
Rs. 653 to 676 ,, II ,, ,,
Rs. 590 to 640 ,, Tinny Karunganni mixture (per cdy.)
Rs. 500 to 540 ,, Tinny

The Uganda lint prices were placed as below:

Rs. 1,700 to 1,200 for M. U. 2 certified (per cdy.)
Rs. 1,120 for M. U. 1 ,, ,,
Rs. 920 to 936 for uncertified Uganda ,,

The prices of Cambodia kapas were placed at Rs. 750 to 800 for the best and Rs. 700 to 750 for the II type.

Kapas: Tirupur: There has been some improvement in the prices of Cambodia and Karunganni kapas towards the close of the month. The prices ruled at the rates of Rs. 110 to 117 and Rs. 86–10–0 to 96–4–0 per pothi for Cambodia and Karunganni kapas respectively.

Koilpatti: No brisk transactions were registered in Koilpatti market.

Ramanathapuram District: The Karunganni kapas market in this district opened at the following rates:

Rs. 84–0–0 to 93–0–0	for I crop	(per pothi)
Rs. 75–6–0 to 82–6–0	for II crop	,,
Rs. 54–4–0 to 65–10–0	for Tinny	,,

There has been a slight increase as quoted below towards the close of the month:

Rs. 92–0–0 to 101–8–0	for I crop	(per pothi)
Rs. 78–12–0 to 85–12–0	for II crop	,,
Rs. 67–8–0 to 74–6–0	for Tinny	,,

The Uganda kapas market opened at the rate of Rs. 131–4–0 to 135–10–0 for best quality and Rs. 96–8–0 to 122–8–0 for II quality. The markets have almost remained steady but with a slight improvement at the end of the month. The prices of Cambodia kapas were ranging from Rs. 43–12–0 to 96–4–0 during the month.

South Arcot District: The average price of kapas marketed in this district ranged from Rs. 78–6–0 to 82–4–0 per pothi.

Cotton Seeds: Koilpatti: The price of Karunganni seeds ruled steady and were placed at Rs. 28/- to 32/- per pothi. It is likely that these prices may spurt up further.

Ramanathapuram District: The minimum and maximum prices of cotton seeds for the different varieties marketed in this district are as follows:

(Prices per pothi of 250 lb.)

Karunganni seeds	Rs. 25–8–0 to 31–8–0
Uganda ,,	Rs. 23–8–0 to 30–0–0
Cambodia ,,	Rs. 19–0–0 to 24–0–0

2. **Groundnuts:** (In this section: Candy = 531 lb. of kernels.
Bag = 80 lb. of pods.

Stocks: South Arcot District: The Groundnut markets in South Arcot District opened with a stock of 3116 tons of kernels at the beginning of the month. Receipts in the month amounted to 3645 tons and 125 tons from outside the districts and outside the States respectively as against a quantity of 6037 tons arrived during the previous month. The consumption by the Oil Mills and Country Chekkus took away 5161 tons and 218 tons respectively. Despatches during the month amounted to 2423 tons and 68 tons respectively to other districts and States. There were wastages to the extent of 780 tons. The month closed with a stock of 7675 tons.

Prices: (a) *South Arcot District:* The average price of groundnut kernels marketed in this district ranged from Rs. 98–8–0 to 100—14—0 per candy.

(b) *Ramanathapuram District:* The prices of Groundnut kernels in Virudhunagar ruled at the rates Rs. 85/- to 100/- for katcha kernels and Rs. 110/- for pucca dried kernels per candy.

3. **Gingelly:** (In this section: Bag = 168 lb.)

South Arcot District: Stocks: The markets of South Arcot district opened with a stock of 1446 bags at the commencement of the month. Arrivals in the month amounted to 4462 bags of which 4443 bags were received by Virudhachalam Market alone as against 6037 bags in all during the previous month. Receipts from Tiruchirapalli district were 186 bags. Country Chekkus consumed 1034 bags for conversion to oil. Despatches amounted to 3542 bags, which were mostly to Ramanathapuram, Madurai, Tirunelveli and Tiruchirapalli districts. There was a closing stock of 650 bags at the end of the month.

Prices: The average price of gingelly seeds in several markets of the district ranged from Rs. 38–6–0 to 42/- per bag.

4. **Coconut and its Products:** (In this section: Candy = 700 lb.)
Coconut: Stocks: The stock particulars of coconuts in the markets of Malabar and South Kanara districts transacted during the month are extracted below:

(In thousands)

Name of the Market	Opening balance	Arrivals	Dis-posals	Closing balance
Malabar district:				
Kozhikode ...	7,700	4,100	5,700	6,100
Ponnani ...	500	340	290	550
Badagara ...	430	1,832	1,747	515
Tellicherry and Dharmadam ...	706	1,036	1,069	673
South Kanara distirct:				
Mangalore ...	50	325	375	110

Prices: (a) Prices of coconuts as between the different markets of Malabar district ruled at the rates of Rs. 80/- to 126/- per thousand nuts during the month.

(b) Prices of coconuts in Mangalore stood at Rs. 150/- to 170/- for raw nuts and Rs. 165/- to 215/- dry nuts.

Copra: Stocks: The stock particulars of copra transacted in Malabar and South Kanara districts during the month are extracted below:

Name of the Markets	Opening balance	Receipts	Dis-posals	Closing balance
Malabar district: (in cdys.)				
Kozhikode ...	1,833	2,200	2,300	1,233
Badagara ...	696	1,510	1,476	736
Mangalore (in tons) ...	33	135	130	39

Prices: (a) The prices of copra as between the differnt markets ruled during the month are extracted below:

(Prices in Rs. per cdy.)

Varieties		Kozhikode		Badagara	
		Maximum	Minimum	Maximum	Minimum
Office	...	292	272	290	275
Edible	...	325	322	325	320
Rajpu	...	375	355	368	350
Madras	...	330	320	325	320
Gola	...	345	320	...	...

(b) The prices of copra in Mangalore ranged between Rs. 275/- to 300/- per cdy.

5. **Arecanut:** (In this section: Bag = 100 lb.)

Stocks: The stock particulars of Arecanut marketed in Mangalore and Malabar districts are extracted below:

(In bags)		Opening balance	Receipts	Disposals	Closing balance
Kozhikode	...	2,393	3,089	3,089	23,84
Ponnani (in cwt.)	...	696	1,510	1,088	388
Mangalore (Supari)	...	1,958	21,800	20,578	3,180

Prices: (a) Prices of Arecanut (choor) in Malabar district ranged from Rs. 138/- to 164/- per bag.

(b) The price ranges of Supari in Mangalore market as between the different varieties are extracted below:

Prices in Rs. per Cwt.

Varieties				*Minimum*	*Maximum*
Koka	...	...	...	85	137
Choll	...	...	...	175	203
Malabar Supari		...	...	110	145
Mangalore Supari		...	...	137	172

6. **Tobacco:** (In this section: Candy = 500 lb.)

Stocks: The market in Coimbatore district opened with a stock of 9,786 cdys. of chewing and 3,450 days of cheroot tobacco. Despatches in the month amounted to 2,900 cdys. of chewing and 1,295 cdys. of cheroot tobacco which were mostly to Malabar, Ramanathapuram, Travancore-Cochin State, North Arcot, Tiruchirapalli, Madurai and Tanjore leaving a closing stock of 7,625 cdys. of chewing and 1,890 cdys. cheroot tobacco at the end of the month.

Prices: Except for a slight increase in the price of superior cheroot tobacco, prices in the case of all other varieties were more or less firm. The prices that prevailed during the month as between the different qualities are extracted below:

(Price in Rs. per cdy.)

Variety	I Grade	II Grade	III Grade
1. *Chewing Tobacco:*			
Sun-cured			
(a) Meenampalayam ...	445 to 495	350 to 420	235 to 305
(b) Other varieties ...	305 to 350	205 to 245	145 to 170
2. Cheroot varieties, Sun-cured (grown in Erode and Bhavani Taluks) ...	390 to 445	335 to 360	195 to 245
3. Chewing varieties, Pit-cured (grown in Palladam & Sulur area) ...	210 to 280	140 to 200	105 to 140

Review of the Activities of the Market Committees during November 1955

Of the seven Market Committees in the State only five, in the districts of North Arcot, South Arcot, Coimbatore, Malabar and South Kanara continued to function actively during the month. The activities of the other two Market Committees viz., Ramanathapuram Market Committee and Tirunelveli Market Committee continued to be restrained on account of writ petitions pending with the court. In the Malabar and South Arcot the terms of office of the committees terminated on 1—11—1955 and 8—11—1955 respectively.

The following progress was made by the Market Committees during the month in the matter of issue of licences under Madras Commercial Crops Markets Act.

	Section 5 (1)		Section 5 (3)		Weighmen		Broker	
	A.	B.	A.	B.	A.	B.	A.	B.
North Arcot Market Committee ..	Report Not Received.							
South Arcot Market Committee ..	491	2,419	457	2,565	497	1,922	2	10
Tirunelveli Market Committee ..	..	..	..	..	..	..	..	..
Coimbatore Market Committee ..	115	712	117	817	43	639	1	8
Malabar Market Committee ..	6	428	90	1,456	4	217	..	5
South Kanara Market Committee ..	11	234	8	192	..	..	..	..

(A = During the month. B = Upto the end of the month from January)

The total volume of transactions in commercial crops in 14 Regulated Markets in the State during November 1955 is extracted below:

Crop		Quantity	No. of Regulated Markets
Groundnut Kernels	..	9,259 tons.	8
Gingelly	..	4,697 bags.	5
Cotton lint	..	343 Cdys.	3
Cotton Kapas	..	9,973 Pothis.	5

(Bag = 168 lb. Cdy. = 784 lb. Pothi = 280 lb.)

II. **Meetings:** *Coimbatore Market Committee:* The second meeting of the Committee was held on 25—11—1955. Thirteen subjects were discussed at the meeting.

No meetings were held in any other Market Committees during the month.

III. **Quality Appraisal:** For analysis of quality factors in groundnuts, the South Arcot Market Committee during the month analysed 378 samples drawn from out of arrivals of 12,417 lots comprising of 43,040 bags of Kernels. (Bag = 177 lb.)

The details of analysis, which are of interest, are extracted below:—

Particulars	Cuddalore	Chinna. salem	Tindivanam	Viruddachalam	Panruti	T. Koilur
1. *Dryage:*						
2% and below ..	5	..	2	19	..	2
Above 2% upto 3%	4	..	..	19	1	..
Above 3% and upto 4% ..	14	..	6	14	4	..
Above 4% and upto 5% ..	17	19	7	20	9	..
Above 5% and upto 10% ..	92	13	9	..	71	4
Above 10% ..	10	..	..	..	17	..
2. *Total Refraction:*						
4% and below ..	49	15	10	32	4	6
Above 4% and upto 8% ..	73	17	14	40	79	..
Above 8% ..	20	..	..	..	19	..

Of the 378 samples, 116 samples accounted for refraction reduced to common basis within 4%, 223 samples within 5 to 8% and 39 samples above 8%.

Sixty-eight entries were secured for summer and winter crop of groundnut kernels for quality competition in South Arcot District.

SOUTH ARCOT MAKET COMMITTEE

Inauguration of the Ninth Regulated Market at Kallakurichi on 15—12—1955
by Sri A. Kunhamed, B. A.,
Collector of South Arcot, Cuddalore

The Ninth Regulated Market of the South Arcot Market Committee was opened at Cuddalore by Sri Arakkal Kunhamed, B. A., District Collector, South Arcot, on 15—12—1955. There was a very large gathering of ryots and traders. Hundreds of ryots had brought their commercial crop, groundnut for sale. Total arrivals for the day exceeded 1350 bags of groundnut kernels in nearly 270 lots. Sri K. Parthasarathi Naidu, B. A., B. L., M. L. A. presided over the function.

Welcoming the audience present, Sri K. Parthasarathi Naidu, gave a brief outline of the activities and the progress achieved by the Committee so far. He said that over 91% of the groundnuts brought for sale into the market centres in South Arcot District is being sold through the Regulated Markets of this Committee. Gingelly and Cotton have also been notified by the Government and the Committer has been arranging to sell these two crops through their markets for the last two yeass. He wanted that jaggery and paddy should be inbluded in the list of commercial crops in South Arcot and sold through the regulated markets of this Committee for the betterment of the growers of this District. He also said that the success of this Committee from the beginning was due to the endeavours of the members and staff of the Committee' The co-operation from the traders' side was also there, though earlier to 1939, the groundnut traders were actually plundering the poor growers by false weights and offering poor prices after making improper deductions.

After his speech, Sri K. Parthasarathi Naidu requested the District Collector to open the Market and to auction by open bid the first five lots of groundnuts received for sale that day.

Inaugurating the market, Sri A. Kunhamed, B. A., (District Collector and Ex-Officio Chairman, South Arcot Market Committee, Cuddalore) said that he was thankful to all present and to the Secretary of the Market Committee in asking him to open the Ninth Regulated Market of the Committee at Kallakurichi, He said that

he was at present the Chairman and was performing the functions of the Committee as well, but would relinquish these powers as soon as the elected body takes charge. He said that a Committee of this kind really helps the growers and traders; in that they are able to know the prevailing market rates (2) in getting competitive prices (3) correct weighment before the Committee's staff (4) immediate payment for the commercial crops sold and (5) full price without deductions for commission, *mahimai* etc. As regards traders he said that they are able to buy their required quantity in one place (2) by the kind of quality and stuff they want (3) direct purchase from growers without intervention of commission agents etc., and (4) finally the good-will of the growers. He said that the gunny service is another service which the Committee has been giving to the sellers. Even bad stuff when it is packed in new gunnies, he said, looks better and fetches a better price. No charges are being levied by the Committee on the sellers or buyers.

The Collector then wishing the Committee all success, opened the Market by cutting the ribbon. The first five lots were then auctioned by him.

The State Marketing Officer, Madras, Sri. Obeidulla Shah said that this committee has achieved great progress in the Marketing of commercial crops, namely groundnuts, in this district. He also said that this was the best market committee in the State and probably in India. He wanted that the committee should arrange to take up other crops and products also soon and bring all them under under notification and regulated sale.

Sri Kandasami Padayachi, M. L. A., Ulundurpet, on behalf of the growers and Sri Venkatachalam Chettiar on behalf of the traders present also spoke and wished the Committee long life and continued success in its undertaking.

After a vote thanks by the Secretary, Sri K. V. Natesan, B. Sc., Ag., the function terminated.

Crop and Trade Reports

Groundnut—Second report 1955—'56—Madras State: The area sown with groundnut upto September 1955 is estimated at 1,225,000 acres. Compared with the area of 1,222,000 acres estimated for the corresponding period of the previous year, the present estimate is an increase of 0·2 per cent. Compared with the average area of 1,208,700 acres calculated for the five years ended 1954—'55, this is an increase of 1·3 per cent. The area under the crop is negligible in the districts of South Kanara and the Nilgiris. The area estimata for the current year is the same as that for the previous year in Chingleput and Malabar districts. An increase in in area has been estimated in the districts of North Arcot, Coimbatore and Tirunelveli and a decrease in the other districts of the State. The yield is expected to be normal in the districts of Tanjore, Tirunelveli and Malabar and slightly below the normal in the other districts. The Seasonal Factor for the State as a whole works out to 96 per cent of the normal which is the same as that for the previous year. The wholesale price of groundnut (machine-shelled) per standard maund of $82\frac{2}{7}$ lb. or 3200 tolas as reported from same important market centres on 8—10—1954 was Rs. 16—4—0 at Cuddalore, Salem and Erode. Compared with the prices which prevailed during the corresponding period of the previous year, the current year's price is a decrease of 8·8 per cent at Cuddalore and 4·4 per cent at Salem and an increase of 6·6 per cent at Erode. Figures of areas by districts are given in the statement appended.

Gingelly—Second Forecast report 1955—'56—Madras State: The area sown with gingelly upto 25th September 1955 is estimated at 234,600 acres. Compared with the area of 236,900 acres estimated for the corresponding period of last year, it shows a decrease of 1·0 per cent. As compared with the average area of 211,400 acres calculated for the five years ended with 1954 '55 the present estimate shows an increase of 11·0 per cent. An increase in area is estimated in the districts of South Arcot, Salem, Coimbatore, Tiruchirapalli, Ramanathapuram, Malabar and South Kanara and a decrease in area is estimated in the districts of Chingleput, North Arcot and Madurai. The area estimated is the same as that of last year in the districts of Tanjore and Tirunelveli. The area under the crop in the Nilgiris district is little or negligible. The early crop of gingelly has been harvested in parts of the State. The yield per acre was below the normal in the districts of North Arcot and Tirunelveli and was normal in Tanjore district. The wholesale price of gingelly seed per standard maund of 82-2/7 lbs. as reported on 1—10—1955 was Rs. 21—10—0 in Tuticorin, Rs. 20—9—0 in Salem and Rs. 18—0—0 in Cuddalore. Compared with the prices which prrevailed on 2nd October 1954, these prices show a fall of 16·5 percent in Cuddalore and 6·0 per cent in Tuticorin and an increase of 13·8 Percent in Salem. Figures by districts are furnished in the statement appended.

Paddy 1955—'56 First report Madras State: The area sown with paddy upto September 1955 in the Madras State is estimated at 2,903.000 acres. Compared with the corresponding estimate of 2,293,000 acres for the previous year, the current year's estimate is an increase of 0·3 per cent. The area estimated in the current year is the same as that for the previous year in the Nilgiris district. A decrease in area is estimated in the districts of Tiruchirapalli, Tanjore, Madurai, Ramanathapuram and South Kanara and an increase in area in all the other districts of the State. The first crop of paddy has been or is being harvested on an extensive area in the districts of North Arcot, Tirunelveli and Malabar. The outturn of these harvests is reported to be fair. Harvests on limited areas were reported from Chingleput, South Arcot, Salem, Coimbatore and Madurai districts and the outturn in these districts also has been reported to have as generally fair. Harvests of crop is reported to have just commenced in Tanjore and South Kanara districts. Water

Prices: The minimum and maximum prices of Cardamom that prevailed during November, 1958 for different qualities were as detailed below:

Name of Market		*Trade Variety*		*Prices per lb.*
(a) *Bodinaickanoor:*	(1)	*Green Bulk.*		
		(Superior extra green)	Rs.	9.49 to 9.50
		Medium	,,	8.00 to 8.45
		Inferior Shipment etc.	,,	7.50 to 7.96
	(2)	Splits	,,	7.00 to ...
	(3)	Lights	,,	5.50 to 7.26
	(4)	Seeds	,,	11.60 to 12.00
	(5)	General (Average price per lb.)	,,	8.29 ...
(b) *Thevaram:*	(1)	*Green bulk.*		
		Superior	Rs.	9.13 to 9.56
		Bold	,,	9.75 ...
		Medium	,,	8.48 to 9.00
		Inferior	,,	8.31 to 8.36
	(2)	Shipment	,,	7.92 to 8.29
	(3)	Seeds	,,	10.70 ...
	(4)	General average	,,	8.84 ...
(c) *Virudhunagar:*	(1)	*Green bulk*		
	(2)	Superior	,,	9.00 to 9.25
	(3)	Medium	,,	8.50 to 8.75
	(4)	Inferior	,,	8.25 ...
	(5)	Seeds	,,	11.75 ...
	(6)	Bold qualities	,,	9.75 ...

Review of administrative activities of market committees during November, 1958.

General: The Market Committees of South Arcot Market Committee, North Arcot Market Committee, Coimbatore Market Committee and Tiruchirapalli Market Committee continued to function during the month. Efforts are being made to function the Market Committees of Ramanathapuram and Tirunelveli due to the disposals of the case in the Supreme Court.

Enforcement: The progress of licensing by the Market Committees during the month were as follows:

Name of the Market Committees	Section 5 (1)		Section 5 (3)		Weighmen	
	A	B	A	B	A	B
South Arcot Market Committee	316	2475	260	1817	236	1679
North Arcot Market Committee	741	2351	727	2091	125	783
Coimbatore Market Committee	146	1487	87	1153	1	605

A = Licences issued during the month.
B = Licences issued up to the end of the month.

Meetings: The eighth ordinary meeting of North Arcot Market Committee was held at Tiruvannamalai on 25—11—1958. At this meeting the Committee discussed the Budget proposals for 1959 and Revised estimates for 1958 and approved the same being forwarded to Government.

There were no meetings held in other Market Committees during the month under report.

Quality Analysis: Nil.

Quality Competition: Nil.

Crop and Trade Reports

Redgram crop — First forecast report — 1958 — '59: The area sown with redgram up to 25th August 1958 in the Madras State is estimated at 116,700 acres. Compared with the area of 116,000 acres estimated for the corresponding period of the previous year, the current year's estimate shows an increase of 0·6 per cent. This is an increase of 2·0 per cent when compared with the average area of 114,400 acres calculated for the five years ended 1957 — '58.

The crop is mainly grown in the districts of South Arcot, Salem, Coimbatore and Tiruchirappalli. The area under the crop is nil or negligible in the Nilgiris district. A decrease in area as compared with previous year is estimated in the districts of South Arcot, Tiruchirappalli and Madurai and an increase in area in all the other districts of the State except Chingleput, Ramanathapuram and Kanyakumari districts where the area under the crop estimated is the same as that for the previous year.

It is too early in the season to forecast the trend of the yield in the different districts of the State.

The average wholesale price of tur dhall per standard maund of 82 2 7 lb. or 3·200 tolas as reported from certain important market centres on 5th September 1958 was Rs. 17·05 at Salem, Rs. 24·56 at Tiruchirappalli, Rs. 25·20 at Vellore and Rs. 28·98 at Cuddalore. Compared with the prices which prevailed during the corresponding period of the previous year the current year's prices reveal a fall of 1·2 per cent at Salem and a rise of 7·3 per cent at Tiruchirappalli and 15·5 per cent at Vellore and 18·4 per cent at Cuddalore.

Gingelly—First Report—1958—'59: The area under gingelly up to the 25th July 1958 is estimated at 1,46,100 acres. Compared with the area of 1,41,000 acres estimated for the corresponding period of the previous year, the present estimate shows an increase of 3·6 per cent. When compared with the average area of 1,42,000 acres calculated for the five years ended 1957—'58, it shows an increase of 2·9 per cent.

An increase in area is estimated in all the districts of the State except Tanjore, Ramanathapuram, Tirunelveli, the Nilgiris and Kanyakumari. The area under the crop in Tanjore, Ramanathapuram and Kanyakumari districts is estimated to be the same as that for the previous year while a decrease in area is estimated in Tirunelveli district. The area under the crop is nil or negligible in the Nilgiris district.

It is too early in the season to forecast the trend in the yield of the crop.

The wholesale price of gingelly seed per standard maund of 82·2/7 lb. (3,200 tolas) as reported from important market centres on 1st August 1958 was Rs. 37·54 at Coimbatore, Rs. 32·50 at Cuddalore, Rs. 29·60 at Salem and Rs. 25·26 at Tiruchirappalli. Compared with the prices which prevailed during the corresponding period of the previous year, the current prices show a decrease of 31·1 per cent at Tiruchirappalli, 20·8 per cent at Cuddalore, 16·9 per cent at Salem and 11·0 per cent at Coimbatore.

COLLEGE AND ESTATE NEWS .

Students Activities — Athletics: Our athletes represented our College in the University Inter-Collegiate Athletic Meet held at Vellore on 14th & 15th of November 1958. It was up to our athletes to defend the Scudder shield of which we were holders last year. Under the able captaincy of Joe Mathias the team was kept fit till the meet. Unfortunately and unexpectedly, in the end we were wanting ½ point more to win the team Championship. Nevertheless, many first and second places were knocked off by our athlets, — Joe Mathias won the Shot put and second place in Dicus throw, and Ramasamy as expected retained his first place in Javelin throw. Our College Champion, Gopalakrishna Shenava breasted the tape first in a good timing in the 400 meter race. Our High Jumper and Volter was adjudged as the 2nd in the High Jump event even though he cleared the same height as the 1st. Varkey did well and got places in 400 meters hurdles and 800 meter race. The 4 x 400 meter race was yet another interesting event which was won by our team, comprising of Varkey, Medappa, Ramaswamy, and Shenava.

From our College Joe Mathias, Ramaswamy and Shenava were selected to represent the Coimbatore Division in the Inter-Division Sports held in Tuticorin on 22nd & 23rd in November. Again Joe Mathias won both the Shot-put & Discus. Ramaswamy was 2nd in the Javelin event, and Shenava was only third in his 400 meters race. Our College was the most to contribute to the Coimbatore Division. Joe Mathias was selected to attend the University coaching Camp at Madras which he is attending now.

In the Coimbatore Olympics, Joe, again got first in the shot-put event and Ramaswamy won the Pentatholon event and thus brought credit to our College.

In the 400 meters open race in connecton with the Govt. Arts College Sports G. Shanava won the 1st place; Medappa won the 2nd place in the open mile race in the Forest College sports.

Games: Our College Basket ball and Volly Ball teams won the respective rolling cups in the tournaments conducted by the Palghat College. Rajanikumar, our Cricket player was selected to represent the mofussil Colleges against the City Colleges. The Badminton team has come to the finals in the University Inter-Collegiate.

Literary and Arts: *Debates:* Our College swept all the four prizes in the inter-Collegiate debating competition conducted by the Planning Forum of the P. S. G. College of Technology. Messrs. Alamgeer and K. S. Sundaresan represented the Tamil team and Mr. Krishna Balal and

Kumari Vijayalakshmi represented the English. Our lady representative won places both in the first and second rounds in the University Inter-Collegiate debate and came up to the finals.

Drama: Here again our College dramatic teams in English and Tamil have made a record by winning the Rolling cups and individual cups assigned for these Competitions. Sri. K. S. Sundaresan ably supported by others acted the Shakspearean drama Merchant of Venice in Tamil, the script written by Mr. Alamgeer,

Officers' Club: (Golden Jubilee Celebrations) The Golden Jubilee of the Agricultural College Officers' Club (1908—'58) was celebrated with great pomp and eclat on Sunday the 23rd November 1958. Dr. Sri C. P. Ramaswamy Iyer inspected a guard of honour, hoisted the National Flag and delivered the Jubilee address touching on various aspects of the College and Club. He paid a glowing tribute to the achievements of the members of the Club and their services to the department and also recalled his old association with the A. C. & R. I. Due to the unavoidable engagements elsewhere of the Hon'ble Minister Sri M. Bakthavatsalam, Dr. K. C. Naik presided over the function. Dr. A. Mariakulandai, President of the Club welcomed the chief guest and Mr. T. D. A. Jayaseelan, Club Secretary read the report tracing the histary, role and utility of the Officers' Club. Sri C. P. Ramaswamy Iyer generously offered a donation of Rs. 250/- for improving the activities of the Club. He distributed prizes to the winners in various items of Club Day Games and Sports.

The Hon'ble Minister for Agriculture along with Dr. C. P. Ramaswamy Iyer graced the luncheon that was held on the occasion.

The members put up a wholesome entertainment in the evening. A beautiful Souvenir containing interesting articles was got up for the occasion.

Award of Research Degrees: Sri Daniel Sundararaj, Lecturer in Botany, has been awarded the Ph. D. degree of the Madras University for his thesis "Studies in the Physiological anatomy of grasses—anatomy as an index for drought resistance."

Srimathi A. Leela David, Assistant Entomologist has been awarded M. Sc. degree by the University of Madras for her thesis "South Indian *Formicidae.*"

Our hearty congratulations to them.

Editor, M. A. J.